FLORA OF PERU

BY

CHARLES BAEHNI

AND

LUCIANO BERNARDI

CONSERVATOIRE ET JARDINS BOTANIQUES, GENEVA

BOTANICAL SERIES
FIELD MUSEUM OF NATURAL HISTORY
VOLUME XIII, PART V-A, NUMBER 3
FEBRUARY 27, 1970

PUBLICATION 1087

FLORA OF PERU

BY

CHARLES BAEHNI

AND

LUCIANO BERNARDI

CONSERVATOIRE ET JARDINS BOTANIQUES, GENEVA

BOTANICAL SERIES

FIELD MUSEUM OF NATURAL HISTORY

VOLUME XIII, PART V-A, NUMBER 3

FEBRUARY 27, 1970

PUBLICATION 1087

Library of Congress Catalog Card Number: 36–10426

PRINTED IN THE UNITED STATES OF AMERICA
BY FIELD MUSEUM PRESS

FLORA OF PERU

CHARLES BAEHNI
AND
LUCIANO BERNARDI

SAPOTACEAE. Chicle family

REFERENCE: Aubréville, Sapotacées, Mémoire I Adansonia 1964. Baehni, Mémoire sur les Sapotacées, III, Inventaire des genres, Boissiera 11, 1965.

Trees or shrubs, in rare instances (namely in some New Caledonian species) undershrubs; pilosity composed of 2-armed hairs. Leaves alternate, entire, in very rare cases opposite or subopposite, generally with precociously caducous stipules, numerous parallel veins ("Calophyllum" blades) in several species of distinct genera (e.g., *Chrysophyllum, Manilkara, Pouteria,* etc.) or fewer distant veins. Flowers small (except *Tsebona,* from Madagascar, when open, the calyx is 7.5 cm. in diameter), pedicels of variable length calyx with 4–5 or 8 sepals, frequently quincuncial or (*Manilkara*) in two valvate verticils (3 x 2), sepals free or partially connate (not more than the half of the entire length of the calyx), glabrous or silky inside, mostly hirsute outside; corolla gamopetalous, tubular or broad campanulate, with imbricate lobes (rarely quincuncial) without appendages (except for *Manilkara,* dorsal appendages, and *Bumelia* with lateral ones), staminodes present or absent, stamens (in the Peruvian genera) as many as petals, filaments attached generally on the throat, ovary mostly 5-celled, 1 ovule in each cell; fruit a berry with 1–5 seeds; seed glossy with a basi-lateral or long ventral scar. Laticiferous vessels always present.

The species are usually readily recognizable, but the separation of the genera proves to be a difficult task, since, in all the family the floral morphology is fairly uniform.

In the present case of the Peruvian flora, we would like to repeat the introductory words of Prof. Mathias and Prof. Constance for the

family Umbelliferae (*Flora of Peru*, Field Mus. Bot., vol. XIII, part V-A, no. 1, p. 4, 1962): "It is hoped that this preliminary revision . . . will encourage collectors and Peruvian students of the family"; our knowledge of the Sapotaceae of this country is inadequate. For instance, of the 39 species and one variety described hereunder, 13 are known only from the Peruvian type; and 23 taxa here presented, have no fruit or seed. It is universally admitted that the taxonomy of this family is almost impossible without—for the same species—flowers, fruit and seeds.

We trust that the reader will bear in mind the inadequacy of the material available for this study and forgive us the imperfection to be found in this work.

Since in the Sapotaceae the floral morphology is never sufficient for the assignation to one or another genus, and because the form of the seed scar is retained as a discriminative generic character, we think it useful to include in the key for *Pouteria*, based on easy characters of leaves, pedicels and flowers, the species: *Mastichodendron Williamsii*, *Richardella glomerata* var. *glomerata* and var. *glabrescens* and *Richardella macrophylla*. For the same reason, in the key for *Chrysophyllum*, I added the Peruvian species of *Cynodendron*, separated from the aforesaid genus on the basis of the seed morphology (*Cynodendron aurdtum, ferrugineum, ovale, revolutum*), and also *Gymnoluma glabrescens*, *Prieurella Prieurii*, *Prieurella Wurdackii*, their floral morphology being very alike to *Chrysophyllum*.

I hope in this manner that the determination of samples devoid of fruit and seeds, should still be possible; for the genera with few species in Peru, as *Achras* (Calocarpum), *Bumelia*, *Manilkara*, *Sarcaulus*, which present easy and discriminating floral characters, the generic key is sufficient.

Flowers 4–5 merous (in some instances 6-merous) with staminodes as numerous as the stamens, fairly and uniformly developed.
Pouteria—and related taxa.

Flowers always 5-merous, without staminodes or with obsolete staminodes, never as numerous as the stamens.
Chrysophyllum—and related taxa.

Calyx composed of 8 sepals, spirally disposed.
Achras (Calocarpum).

Calyx composed of 6 sepals on two verticils; corolla with appendages . . . . . *Manilkara*.

Calyx composed of 5 valvate sepals; corolla without appendages. *Pouteria Bouffardiana.*

Calyx composed of (usually) 4–5 quincuncial (rarely imbricate) sepals.

Staminodes always present, equal in number to the stamens.

Lateral appendages of the corolla present. . . . . *Bumelia.*

Lateral appendages absent.

Corolla fleshy, very thick, apparently valvate. *Sarcaulus.*

Corolla generally membranous, never very thick, imbricate or quincuncial.

Ovules attached to the base of the loculi; seeds with a basi-lateral scar and erect embryo. *Mastichodendron.*

Ovules not attached to the base of the loculi.

Seed-scar somewhat narrow, more or less elongated. *Pouteria.*

Seed-scar covering nearly the entire seed. . *Richardella.*

Staminodes absent or obsolete, irregularly present (1–2 per flower) never in the same number as the stamens.

Inflorescences cauliferous (seed-scar lateral and narrow). *Prieurella.*

Inflorescences ramiflorous.

Seed-scar lateral and narrow, seed 2 or more per fruit. *Chrysophyllum.*

Seed, generally 1 per fruit.

Seed-scar lateral, broad and long. . . . . *Gymnoluma.*

Seed-scar basilar or basi-lateral, very short. . *Cynodendron.*

ACHRAS L.

Calocarpum Pierre in Urb. Symb. Ant. 5: 97. 1904. *Urbanella* Pierre, Not. Bot. Sapot. 25. 1890. *Achradelpha* O. F. Cook, Journ. Wash. Acad. Sci. 3: 160. 1913; Contrib. U. S. Nat. Herb. 16: 277. 1913.

REFERENCES: Aubréville, Adansonia 5: 16. 1965, Pl. 1, p. 18 [to read *Achras sapota* L. and not *Nispero Achras* (L.) Aubr., cf. Adansonia 5: after p. 580. 1965]; Gilly, Trop. Woods 73: pp. 5 and 20. 1945; Fosberg, Taxon 13: 254. 1964.

A small genus containing perhaps 5–6 species characterized by the calyx which is composed of 7–8 spirally arranged sepals, the outer ones being smaller than the inner ones. Otherwise the flowers resemble those of the genus *Pouteria*. The seeds, as far as we know, have a long and narrow scar.

The best known species, cultivated to some extent in Tropical America is *Achras zapota* L. [sensu Aubréville, non auct.=*Calocarpum mammosum* Pierre] whose large ovoid fruits are edible.

Achras buchananiifolia (Pierre) Bernardi, Candollea 22: 230. 1967. *Calocarpum buchananifolium* (Pierre) Dubard, Ann. Mus. Col. Marseille 20: 9. 1912. *Urbanella buchananiaefolia* Pierre, Not. bot. Sap. 25. 1890.

Tree (?), twigs glabrous, slender, ribbed. Leaves membraneous, narrowly oblong obovate, long acuminate at the tip, tapering to the cuneate base in the young leaves, or with one acute base in the old ones, entirely glabrous, 10–16 cm. long, 2–4 cm. wide; petioles glabrous, 8–11 mm. long, slightly canaliculate; midrib very prominent on both sides, veins in 8–12 pairs, arcuate-ascendent, slender, obsolete above, more robust and visible below; venation forming a dense and fairly conspicuous network; petioles subcanaliculate, 8–10 mm. long. Flowers few, in the axils of leaves or above the scars, sessile, near to 4 mm. long; sepals 8, the three external small (1–2 mm.), triangular, hairy outside, the other 5 (3.5 mm. long) broad ovate, thinner, ciliolate at the margins, glabrous outside, all the sepals, however, silky inside; corolla tubular, glabrous, 3 mm. long, lobes 5 of the same length as the tube, broad-ovate, staminodes petaloid, fleshy, oblong, 1 mm. long, fertile stamens with filaments very short, attached to, or somewhat below the throat, anthers emarginate, less than 1 mm. high, pistil 3 mm. high, with ovary globular, scarcely 1 mm. high, covered by long and erect silky hairs which hide the base of the glabrous, stout style; stigma obsolete; ovary 5-celled, with ovules narrowly attached from the inferior half of their adaxial side to the basal area of the loculi. Fruit unknown.

Known only from the type. San Martin: near Tarapoto, *Spruce 4514* (G).

BUMELIA Sw.

REFERENCES: Candolle A. Prodr. 8: 154. 1844; Engler, Bot. Jahrb. 12: 519. 1890; Baillon, Histoire des plantes 11: 277. 1891–1892; Dubard, C. R. Acad. Sci. p. 393, févr. 1911; Baehni, Candollea

7: 424. 1938; Record, Trop. Woods 59: 29. 1939; Brown & Clark, Am. Journ. Bot. 27: 237. 1940; Clark, Ann. Mo. Bot. Gard. 29: 155. 1942; Cronquist, Journ. Arn. Arb. 26: 445. 1945; Lloydia 9: 242. 1946; Bull. Torr. Bot. Club 73: 465. 1946; Meyer, Lilloa 13: 109. 1947; Wood & Channell, Journ. Arn. Arb. 41: 7. 1960; Chambers, Trop. Woods 112: 40. 1960; Baehni, Boissiera 11: 134. 1965.

Shrubs or trees, often spiny. Inflorescences simple, ramiflorous; flowers generally pentamerous, corolla lobes with a pair of lateral appendages at the base. Berry 1-seeded (rarely 2–3), small; seed-scar basilateral or basal; embryo vertical.

Bumelia obtusifolia Roem. & Schult., Syst. Veg. 4: 802. 1819; Cronquist, Journ. Arn. Arb. 26: 456. 1945.

Shrub or small tree, often spiny. Leaves oblanceolate to broadly ovate, rounded at the tip, initially sericeous beneath, later glabrate, 2–5 (–9) cm. long, 1–3 (–4.5) cm. wide. Flowers solitary or numerous in axillary clusters, subsessile or in pedicels up to 8 mm. long; sepals 1.3–3 mm. long, strigose or sericeous; free lobes of the corolla 5, as long as or longer than the tube, each with a pair of lateral appendages; staminodes from narrowly oblong and erose to ovate and subentire, sometimes hooded, about 1.5–3.2 mm. long; style about 1.5–4.6 mm. long. Berry small, ellipsoid-cylindric to subglobose, about 8–15 mm. long, seed obovoid, scar circular, "glabellae" about half as high as the seed.

Cajamarca: "in ripa fluminis Amazonum, ad confluentem Chinchipen," *Humboldt & Bonpland.*

CHRYSOPHYLLUM L.

REFERENCES: Cronquist, Bull. Torr. Bot. Club 73: 287. 1946; Aubréville, Adansonia 1: 9. 1961; Baehni, Boissiera 11: 71. 1965.

Trees or shrubs; under surface of leaves often sericeous, the hairs malpighiaceous, or stalked and bifurcate; venation of various types. Flowers in axillary clusters, generally 5-merous (rarely 4–6 merous), sympetalous; staminodes wanting, or rarely a few casual and irregularly developed vestiges; ovary (2)–5–(10)-celled; ovules attached laterally or basilaterally to the axial placenta; style short columnar. Fruit generally fleshy, indehiscent, with (1–) 4–5 seeds, rarely more, with narrow or moderately broad basilateral scar.

Adult leaves glabrous or with a few scattered hairs beneath.

Flowers pedicellate; pedicels twice (or more) as long as the flowers, corolla glabrous.

Leaf blades membranous, elliptical, gradually acuminate, tertiary veins almost obsolete; fascicles of flowers on the young branchlets..... *Cynodendron ovale.*

Leaf blades coriaceous obovate; fascicles generally on the old, leafless branch.

Venation network fairly conspicuous on both sides; blades more than 10 cm. long..... *Prieurella Wurdackii.*

Venation network obsolete; blades less than 8 cm. long. *Chrysophyllum Wurdackii.*

Flowers almost sessile, or with pedicels as long as the flowers.

Corolla densely hairy, rust-coloured hairs. *Cynodendron revolutum.*

Corolla glabrous.

Corolla lobes as long as the tube, filaments inserted on the throat; membranous blades with secondary veins and fairly distinguishable network..*Chrysophyllum albipilum.*

Corolla lobes 3 times longer than the tube; filaments inserted at the base of the tube; fleshy-coriaceous blades with quite obsolete network..... *Gymnoluma glabrescens*

Adult leaves covered beneath with white or coloured hairs.

Flowers pedicellate, twice (or more) longer than the flowers, generally on the old branches..... *Prieurella Prieurii.*

Flowers almost sessile, or with pedicels as long as the flowers.

Corolla hairy outside.

Calyx sericeous inside; blades generally oblong, persistently rufous-sericeous below..... *Cynodendron ferrugineum.*

Calyx glabrous inside; blades generally elliptic, sometimes becoming glabrate with age..... *Cynodendron auratum.*

Corolla glabrous.

Stamens exserted; blades less than 8 cm. long, petioles barely 1 cm. long..... *Chrysophyllum granatense.*

Stamens included; blades more than 15 cm. long, petioles 3–4 cm. long..... *Chrysophyllum Ulei.*

Chrysophyllum albipilum Cronq. Bull. Torr. Bot. Club 73: 299. 1946.

Small tree, 7 m. high (collected only once!), branchlets slender, terete, sparsely white pilose. Leaves membranous, elliptic, at the border slightly undulate, dull on both sides, soon glabrate above, white-shining sparse-minutely puberulous beneath, 4–11 cm. long, 2–4.5 cm. wide, however frequently 6 x 2.5 cm.; midrib hardly impressed above, scarcely prominent beneath; secondary veins about 7–10 pairs, obsolete on the upper side, slightly raised on the back, arcuate near the margins; veins rather irregular, forming a very loose reticulum; petioles 2–4 mm. long, hardly canaliculate, white appressed pilose. Flowers pentamerous, by 2–4 in the axil of leaves, pedicels gray-sericeous, 2 mm. long; calyx quincuncial, deeply lobed, 2 mm. high, outer sepals ovate-acute, the inner ones obtuse, sparsely pilose on the back, glabrous inside, ciliate and thinner at the margin, elsewhere fleshy; corolla green, glabrous, 4 mm. high; lobes 5, ovate, quincuncial, about half as long as the tube; filaments very short, nipple-shaped, attached to the throat, anthers 0.5–0.6 mm. long with divergent cells; pistil conical, scarcely 1.5 mm. high, with ovary depressed, finely pilose, contracted to the thick, glabrous, finely 5-furrowed style, 1 mm. long, stigma lobes (4) 5. Ovary (4) 5-celled, with loculi proportionally spacious, ovules attached near the base of the loculi. Fruit unknown.

San Martin: Juan Jui, Alto Río Huallaga, 400–800 m., *Klug 4365*, type (F, G).

Chrysophyllum granatense Spreng. Syst. 1: 667. 1825. *Nycterisition argenteum* H.B.K. Nov. Gen. & Sp. 3: 238, *t. 244*. 1818.

Tree (?) known only from the type! Branchlets terete, somewhat wrinkled in the herbarium sample, appressed silky tomentose toward the ends as also on the elongated leaf buds. Leaves elliptic (rarely elliptic-obovate), coriaceous, 4–5 (6) cm. long, 2–2.5 (3) cm. wide, glabrous and shining above, white-sericeous beneath, midrib slender and impressed above, fairly robust and prominent beneath; blades closely and conspicuously striate above, the thread-like veins almost parallel, averaging 0.5 mm. apart, jointed near the border, fairly obsolete beneath; petioles 5 (8) mm. long, semiterete, canaliculate, silky. Flowers 6–9 in axillary fascicles, slender and silky pedicels 3–4 mm. long; calyx quincuncial (in the unique sample at our disposal, 4 and 6-merous flowers were also observed); sepals almost completely free, large-ovate, scarcely more than 1 mm. high, silky puberulous on the back, glabrous inside; corolla glabrous inside, with some silky hairs outside, fairly fleshy, with a very short tube, less than 1 mm.

long, petals ovate, reflexed, 1.5 mm. high; fertile stamens exserted (4) 5 (6), with slender and subulate filaments attached at the top of the tube, anther oblong-acute, cordate and bilobed at the base, dorsifixed; pistil 3 mm. high, with a glabrous and slender style nearly 2 mm. long, stigma punctiform, almost obsolete; ovary tawny-hirsute, (4)– 5– (6)-locular, ovules attached by the middle of their adaxial side.

Known only from the type collection. Cajamarca: near Jaén (de Bracamoros) 550–600 m. alt. *Humboldt & Bonpland s/n* (P).

Chrysophyllum Ulei Krause, Notizbl. Bot. Gart. Berlin 6: 171. 1914; Baehni, Boissiera 11: 74. 1965. *Ecclinusa Ulei* (Krause) Gilly ex Cronq. Bull. Torr. Bot. Club 73: 311. 1946. *Ragala Ulei* (Krause) Aubrév. Adansonia 4: 368. 1964. *Ecclinusa balata* Ducke, Arch. Jard. Bot. Río de Janeiro 6: 76. 1933; Aubréville, l.c. *Chrysophyllum balata* (Ducke) Baehni, Boissiera 11: 75. 1965. *Chrysophyllum Klugii* Baehni, Candollea 7: 134. 1936. *Ecclinusa Klugii* Cronq. Bull. Torr. Bot. Club 73: 311. 1946.

Medium-sized or tall trees up to 40 m. high, branchlets robust, strongly compressed at the end, almost square in transverse section, rusty or ochre, short appressed pilosity, hairs, however, caducous with age. Leaves coriaceous, large elliptical to obovate, frequently with a large and short acumen, rounded at the base, 16–20 (30) cm. long, 9–11 cm. wide; blades on the upper side soon becoming glabrate, covered below with glossy, appressed, reddish hairs, which, in some cases fall more or less completely, the under surface glabrate and dull; petiole very strong, 3–4 (5) cm. long, canaliculate; midrib fairly impressed above, strongly prominent beneath; secondary veins, 15–20 pairs, conspicuously raised beneath, parallel, straight except near the margin, where they are slightly arched; tertiary veins almost obsolete not visible without a lens, dense, equidistant, more or less parallel. Flowers fasciculate in the axils or above the leaf scars; pedicels stout, short, ochre-colour or rusty tomentose, scarcely 2 mm. long; sepals 5 (6 ?) ovate, obtuse, almost completely free, up to 3–4 mm. high, quincuncial, hairy on the back like the pedicels, glabrous inside; corolla glabrous, campanulate, 5 mm. high, tube only 1.5 mm. long, lobes 5, imbricate, broadly ovate; fertile stamens 5, with stout filaments, attached to the middle of the tube, 2 mm. long, anthers large, 1 mm. high, apiculate, basifixed; pistil 4 mm. high, rather conical, ovary long pilose, approximately 2 mm. high, style attenuate, stigma barely thickened; ovary 5 (6)-celled, locules opened just at the base

of the carpels, ovules attached by their basal-ventral side. Berry becoming almost ligneous with age, globular-depressed, at the beginning covered with short tawny hairs, later glabrate, approximately 3 cm. in diameter, supported by the accrescent, nearly lignified calyx; seeds 2–3 (more ?), free, nearly 2 cm. long, with scar rather narrow and short (after Ducke l.c.).

Type: *Ule 8729* (B) destroyed in the past war; I do not know if duplicates of this number are extant.

Guyana, Brazil (Amazon), Peru. Loreto: Tierra Doble on the Río Nanay, *Williams 911* (F).—San Martín: Zepelacio, near Moyobamba, 1100 m., *Klug 3699* (F).

To this species could belong two sterile specimens of Ll. Williams, from Loreto: *907* (Tierre Doble on the Río Nanay) and *929* (Timbuchi on the Río Nanay). However, because of the glabrate undersurface of the blades, they resemble even more *Chrysophyllum sanguinolentum* (Pierre) Baehni.

Chrysophyllum Wurdackii (Aubr.) Bernardi, Candollea 22: 231. 1967. *Noxythece Wurdackii* Aubr. Adansonia 5: 201. 1965.

Tree 25 m. high (only once collected) with stout, erect, greyish branchlets, terete except for the compressed, furrowed and sparsely rusty puberulent extremities. Leaves obovate, fleshy-coriaceous, generally rounded or very obtuse at the tip, cuneate-elongate toward the base, merging gradually into the flat and sparsely silky pilose petiole only 5 mm. long; blades 4–6 cm. long, 1.5–2 cm. wide, somewhat wrinkled (in botanical samples), glabrous and opaque above, whitish (glaucous when fresh) beneath with scattered small, silky hairs; midrib flat on the upper surface, imperceptibly prominent on the reverse side; lateral veins in 8–10 pairs, very thin and scarcely noticeable on both sides; veinlets and network obsolete. Fascicles 10–15-flowered, in the axils of the leaves and leaf-scars and on first year's newly lignified branchlets; pedicels very loosely puberulent, 4–5 mm. long, gradually swollen toward the receptacle; calyx quincuncial, opening very early in the bud's development, composed of sepals having their lower halves connate to the receptacle, with very scattered reddish hairs, lobes very broad-ovate, 2 mm. wide, 1–1.25 mm. long, glabrous inside, fleshy, with nearly scarious margins; corolla tubular, about 2 mm. high, fleshy, glabrous, with imbricate petals broad-ovate, half as long; 5 stamens, 1 mm. high with very short filaments attached at the throat, anthers broad, obtuse, basifixed; staminodes generally absent, or only 1–2, very small and irreg-

ular; pistil broad, flatted conical, 2 mm. wide at the base, 1 mm. high, pubescent, with a style half as long, evenly decreasing in diameter up to the small, adnate stigmas; ovary bi-celled, with 2 ovules narrowly attached by the middle of their adaxial side. Fruit unknown.

Known only from the type. Amazonas: Prov. Bagua, forested ridge on right bank of Río Santiago 2–3 km. above mouth, elev. 300–350 m., *Wurdack 2409*, Type (F).

CYNODENDRON Baehni

REFERENCES: Baehni, Arch. Sci. Genève 18: 34. 1965; Boissiera 11: 142. 1965; Aubréville, Adansonia 6: 192. 1966.

An American genus of medium-sized trees having coriaceous leaves, frequently silky beneath and with numerous parallel veins, flowers in axillary fascicles, calyx 5-merous, imbricate or quincuncial, 5 (6–7) petals without appendages, 5 stamens, staminodes absent, ovary (4) 5 (6–7)-locular, medium or small-sized fruit, generally 1-seeded (rarely 2 or more, free), seed-scar small or very small, lateral or basilateral.

The species of *Cynodendron* were previously in the genus *Chrysophyllum*; for the floral characters and general vegetative appearance, *Cynodendron* is very similar to that of the old Linnean genus; however, since the taxonomy of the Sapotaceae is based, according to all the recent authors, not only on the floral morphology, but also on the seed scars, *Cynodendron* must be accepted.

For specimens devoid of fruit, the identification of *Cynodendron* or *Chrysophyllum* species will always be hypothetical; only sound floristic and phytogeographical studies could help the taxonomist in this event.

Cynodendron auratum (Miq.) Baehni, Boissiera 11: 143. 1965. *Chrysophyllum auratum* Miq. in Mart. Fl. Bras. 7: 27. 1863. *Chrysophyllum auratum* var. *majus* Miq. l.c. *Chrysophyllum sericeum* A.DC. Prodr. 8: 158. 1844 (non Salisb. Prodr. p. 138. 1796. *Chrysophyllum cainito* L.).

Tree, small or medium-sized, up to 30–35 m., rarely a shrub; branchlets fairly robust, flexuose, terete and ochre-yellow except the ends which are compressed and rusty-sericeous, eventually becoming glabrate. Leaves membranous, elliptic, ovate to obovate, rarely oblong, acuminate or abruptly acuminate at the tip, acute or subcuneate at the base, glabrous above, more or less persistently bronze-silky

beneath, in some instances almost glabrate, 10–15 cm. long (rarely more or less) and 5–8 cm. wide; petioles appressed rusty pubescent, fairly canaliculate, 10–15 (20) mm. long; midrib thin impressed above, strong prominent beneath; lateral veins well-spaced and arching, 14–18 pairs, scarcely noticeable above, thin but distinctly raised beneath, the other veins almost obsolete. Flowers 10–20 in the axil of leaves or even more numerous above the leaf scars; rarely on short lateral and defoliated twigs; pedicels 3–5 mm. long, bronze-silky slender when elongated; calyx pentamerous, very thick, lobes almost free, quincuncial, thinner near the margin, large ovate, almost orbicular, rusty hairy on the back, glabrous inside or, in rare instances, with few hairs, 2 mm. high; corolla tubular, more or less densely silky outside except at the upper end of the lobes, 4–5 mm. (rarely more) long; lobes 5 (–6), ovate, rounded, 1–2 mm. long, imbricate or—observed only in Guyana specimens—quincucial; filaments very short, stout, attached to the throat, anther obtuse, with thecae divergent at the base; pistil almost conical, with a hirsute ovary, 5 (6)-celled, ovules attached toward the base, style 1 (–2) mm. long. Berry wide-ellipsoid, about 1.5–2 mm. long; seed solitary with broad basilateral obcordate scar extending to about the middle.

Type: *Schomburgh 864*, Roraima, British Guiana.

Guianas, Venezuela, Colombia, Brazil, Peru. Loreto: Mishuyacu, near Iquitos, 100 m. alt.: *Klug 1318* (F); Lower río Huallaga, 155–210 m. alt.: *Williams 3945* (F, S).

Cynodendron ferrugineum (Ruiz & Pavón) Bernardi, Candollea 22: 231. 1967. *Nycterisition ferrugineum* Ruiz & Pavón, Fl. Peruv. 2: 47, *Ic. 187*. 1794; Prodr. 30, *Ic. 5*. 1794. *Chrysophyllum ferrugineum* (Ruiz & Pavón) Steud., Nomencl. ed. 2, 1: 359. 1840 [non Gaertn. f. Fruct. 4, 122, *tab 202, fig. 1*, 1805. *Cynodendron oliviforme* (L.) Baehni]. *Chrysophyllum Pavonii* Cronq. Bull. Torr. Bot. Club 73: 306. 1946.

Medium-sized tree, up to 25 m. high (ex Ruiz & Pavón, l.c.); branchlets slender, light brown, densely rusty-red pilose at the ends, compressed, becoming glabrate. Leaves elliptic to oblong, membranous, acute to subacuminate at the tip, acute at the base, glabrous above except at the base of the impressed midrib, rufo-sericeous below, 8–12 cm. long, 3–5 cm. wide; petioles rusty-pilose slightly angulate and canaliculate, 8–10 mm. long; midrib beneath fairly prominent; lateral veins numerous; more than 20 pairs, very thin and raised on both sides, bifurcate near the margins. Flowers numerous

on short lateral defoliated pilose twigs, at the axil of leaves or above the leaf scars, pedicels sericeous, compressed, 1–2 mm. long; calyx pentamerous, 2 mm. high, with sepals ovate 1 mm. long, thick coriaceous, hairy outside, sericeous inside; corolla tubular, pentamerous hairy outside, except at the end, up to 4 mm. long; petals imbricate, nearly 2 mm. long, ovate; filaments very short, attached on the throat, anthers small, obtuse; ovary globose, 1–1.5 mm. wide, hirsute, 5-celled, loculi opened near the base, ovules attached at the middle of their ventral side or toward the bottom; style very short, stigma with 5 small protuberances. Berry unknown.

Type: Ruiz "*Nycterisition ferrugineum*, verancule Chichimicuna" (G).

Brazil (Río Jurúa, Sáo Sebastião, *Ule 5164*).—Loreto: Iquitos, shore of Río Itaya, *Asplund 14278* (S)—San Martín: Juan Jui, Alto Río Huallaga, 400 m. alt., *Klug 3843* (F, S)—Huánuco: "Cuchero, Chinchao et Pillao ad Chacahuassi [sic], nemoribus imis et calidis," *Ruiz & Pavón* (G, F, MA).

Cynodendron ovale (Rusby) Bernardi, Candollea 22: 231. 1967. *Chrysophyllum ovale* Rusby, Mem. N. Y. Bot. Gard. 7: 320. 1927; Cronquist, Bull. Torr. Bot. Club 73: 304. 1946.

Medium-sized or tall tree up to 25–40 m. high; branchlets slender, grey, coarsely angled at the end, appressed rusty pubescent, soon glabrous. Leaves membranous, elliptic, less frequently elliptic-ovate, abruptly acuminate, rounded or obtuse at the base, glabrous except for a few scattered hairs below, 6–11 cm. long, 2.5–6 cm. wide, petioles white pilose, becoming glabrate, scarcely canaliculate, 4–6 mm. long; midrib impressed above, prominent but slender beneath; 15–20 pairs of lateral nerves, very thin and slightly raised on both sides. Flowers, 10–20 in the leaf axils or above the leaf scars; in some instances, fascicled on a very short lateral leafless twig; pedicels slender, white puberulent, 4–6 mm. long; calyx quincuncial with moderately thick sepals with thinner borders, broadly ovate, almost completely free, sparingly pilose on the back, sericeous inside, 1 mm. high; corolla quincuncial, glabrous, fleshy, campanulate, 3 mm. long, lobes 5, ovate, scarcely 2 mm. long; stamens less than 1 mm. long, with filaments attached to the throat, small anthers with divergent cells; pistil globular, 1 mm. diameter, finely tawny pilose with stigma almost sessile and with five small lobes; ovary 5-celled, with ovules attached by the middle of their ventral side. Fruit "globose or a little longer than broad, about 1.5 cm. broad, fleshy, mostly 1-seeded

in my specimens, the seed 1 cm. or more long and more than half as broad, ellipsoid, light-brown, somewhat shining, the gray hilum taking up two-thirds of the length and half the circumference of the seed." (After Rusby, l.c.)

Type: *O. E. White 1384-A* (NY), Bolivia, Esperanza Falls (not seen).

Brazil, Peru, Bolivia.—Loreto: Florida, Río Putumayo, at mouth of Río Zubineta, alt. 180 m., *Klug 2324* (F, G, S).—Madre de Dios (or: Brazil ?): Río Acre, Monte Mó, *Ule 9694* (G).

Cynodendron revolutum (Mart. & Eichl.) Bernardi, Candollea 22: 231. 1967. *Chrysophyllum revolution* Mart. & Eichl. in Mart. Fl. Bras. 7: 104. 1863.

Medium-sized tree, branchlets compressed at the extremity, almost 4-angular, ochre-yellow pubescent becoming glabrate. Leaves elliptic, rarely elliptic-oblong, almost coriaceous, revolute at the margin, eventually glabrescent above except on the midrib, puberulent beneath with forked hairs more dense along the midrib, 6–9 cm. long, 3–5 cm. wide, petioles stout, rufo-hirsute, semi-terete, 5 mm. long; midrib stout and fairly prominent beneath, obsolete and slightly impressed above; lateral veins about 10–15 pairs a little raised beneath, nearly obsolete above, spreading and arched toward the margin. Flowers sessile or sub-sessile, 8–10 in the axils of leaves or above the leaf scars; pedicels, when present, very short, stout and rufo-hirsute; calyx pentamerous, with almost completely free sepals, triangular, nearly 2 mm. long, very thick, rufo-hirsute on the back, appressed pilose inside; corolla tubular, fleshy, densely hairy outside except below the sepals and at the tips of the lobes, glabrous inside, 4–5 mm. long, lobes 3, quincuncial, ovate, nearly 1 mm. long, filaments very short, attached to the throat, anthers 0.4–0.5 mm. long; pistil globose, nearly 2 mm. long, densely rufous hairy except at the end of the short style (up to 0.5 mm. long);ovary 5-celled, loculi opened at the middle, ovules attached by the central portion of their ventral side. Berry ellipsoid-globose, about 12 mm. long, single-seeded; seed-scar basilateral, very broad and long, more than rather half the length of the seed.

Type: *Spruce 4260*, "prope Tarapoto, Peruvia orientalis."

San Martín: *Spruce 4260* (F, G). Tarapoto, 750 mi. *Williams 5522*; *6140* (F); Alto Río Huallaga, 360–900 m. *Williams 6655* (F). Juan Guerra, 720 m. *Williams 6900* (F).

GYMNOLUMA Baill.

REFERENCES: Engler, in Engl. & Prantl, Nat. Pflanzenf. Nachtr. p. 274. 1897; Aubréville, Adansonia 1: 26, *t. 10, fig. 8.* 1961; Baehni, Boissiera 11: 100. 1965.

Trees; flowers fasciculate, calyx without appendices, pentamerous, petals 5, almost free, staminodes completely lacking, or few (1–2) and irregular, ovary (in American species) tri-locular, globose fruit one-seeded with long and large scar, vertical embryo.

Gymnoluma glabrescens (Mart. & Eichl.) Baillon, Hist. Pl. 11: 292. 1891. *Lucuma glabrescens* Mart. & Eichl. in Mart. Fl. Bras. 7: 72, *t. 46, fig. 1.* 1863. *Vitellaria glabrescens* (Mart. & Eichl.) Radlk. Sitzb. Math.-Phys. Cl., Acad. Wiss. München 12: 326. 1882. *Pouteria glabrescens* (Mart. & Eichl.) Baehni, Candollea 9: 350. 1942. *Oxythece Ferreirii* Cronq. Bull. Torr. Bot. Club 73: 468. 1946. *Elaeoluma glabrescens* (Mart. & Eichl.) Aubr. Adansonia 1: 26. 1961.

Tree, with stout branchlets, almost cylindrical in the lower portion of the samples, slightly compressed at the ends, light-brown, dull and glabrous. Leaves alternate, at the ends of the branchlets, becoming sub-opposite, fleshy-coriaceous, glabrous, dull on both sides, very peculiar in herbarium samples for the inferior side ochre-coloured; elliptical or oblong, 8–15 (20) cm. long, 5–7.5 cm. wide, petioles 10–15 mm. long, stout and flat on the upper side; midrib prominulus beneath; secondary veins in 10 or more pairs, very slender, patent and slightly arcuate near the edges of the blade, as a rule, never parallel. Flowers 5–10 in the axils of the leaves, or above the leaf scars, pedicels glabrous and robust, 3–5 mm. long; calyx pentamerous, quincuncial, the outer sepals broadly ovate and coriaceous, the two inner thinner and elliptical, 4–6 mm. long; corolla 5–6 mm. long, membranaceous with tube very short, petals 5, elliptical, 4 mm. long; stamens 5, filaments robust, 1 mm. long, attached near the base of the corolla, anthers dorsifixed, sagittate, 2 mm. long; staminodes not observed; pistil 2 mm. long, with ovary nearly cylindrical and half as long as the whole pistil, minutely tomentose, style stout and glabrous, with obtuse and inconspicuous stigma; loculi 3 (5), with the ovules attached at the top. Berry globose, smooth, 2 cm. diameter, one-seeded; seed ellipsoid 10 x 8 mm., with a long and large scar, conspicuously warty.

Type: *Spruce 2029*, Río Negro, between Barcellos and S. Gabriel, Brazil.

Amazonian Brazil and Peru (Venezuela, Colombia ?). Dept. Loreto: Iquitos and vicinity; *Williams 3669* (F).

MANILKARA Adans.

REFERENCES: Reede, Hort. Malab. 4: *t. 25.* 1683; Dubard, Ann. Mus. Col. Marseille 23: 6. 1915; Cronquist, Bull. Torr. Bot. Club 72: 550. 1945; Monachino, Phytol. 4: 94. 1952; Baehni, Boissiera 11: 91. 1965.

Trees frequently tall, or sometimes shrubby, with hard red wood; inflorescences simple, ramiflorous, fasciculate, flowers usually with long and slender pedicels; sepals 3+3, petals 6, thin, each with two dorsal appendages; stamens as many as the corolla-lobes, alternating with an equal number of staminodes; ovary 6–14-loculate; berry 1–2 (4)-seeded, with seeds free, seed-scar narrow and short, embryo upright.

Manilkara surinamensis (Miq.) Dubard, Ann. Mus. Col. Marseille, 23: 22. 1915. *Mimusops surinamensis* Miq. in Mart. Fl. Bras. 7: 43. 1863. *Mimusops amazonica* Huber, Bol. Mus. Goeldi 4: 433. 1904. *Mimusops maparajuba* Huber, l.c. p. 434. *Manilkara amazonica* (Huber) Chev. Rev. Bot. Appl. 12: 276. 1932. *Manilkara bidentata* Williams [non (A.DC.) A. Chev.], Field Mus. Publ. Bot. 15: 412. 1936.

Medium-sized tree, up to 30 m. high; branchlets thick, light brown, glabrous, covered with leaf scars. Leaves papery, rarely coriaceous, slightly obovate to elliptical, rounded or slightly emarginate, in some instances subacute at the tip, cuneate at the base, glabrous on both sides, with a strongly prominent midrib beneath, secondary veins very numerous, thin and parallel, tertiary ones forming an obsolete but dense network; blades 8–12 cm. long, 3–5 cm. broad; petioles slender, glabrous, canaliculate, 15–30 mm. long. Flowers whitish, generally crowded at the ends of the branchlets, in few-flowered (3–5) but numerous fascicles; slender and glabrous pedicels (10)–12–(16) mm. long; the 3 outer sepals glabrous or covered with deciduous squamulae, the 3 internal ones whitish pubescent, 3–3.5 x 2 mm.; corolla appendages narrow-ovate, 3.5 mm. high, 1–1.2 mm. wide, petals alike, concave and connate at the base, forming a tube 1 mm. high; 6 fertile stamens 3–3.2 mm. long, with stout dorsifixed anthers and filaments 2 mm. long; staminodes as long as the stamens, 2–4 -dentate or -laciniate, with divisions generally less than 1 mm. long; pistil 5–5.5 mm. high, with more or less conical ovary quite glabrous

less than 2 mm. high, style stout, attenuated toward the obscurely bi-lobed stigma; ovary 6–7-celled. Berry turbinate-globose, 15–18 mm. wide, with 1–2 seeds compressed, up to 15 mm. long.

Type: *Spruce 3351* "Habitat ad flumina Cassiquiari, Vasiva et Pacimoni" (Venezuelan Amazonia).

Venezuela, Brazil, Peru. Loreto: Tierra doble on the Río Nanay, *Williams 893* (F, G); Caballo-Cocha, on the Amazon River, *Williams 2260* (F); Lake Victoria, on the Amazon River, *Williams 2572a* (F)—S. Martín: Alto Río Huallaga, 360–900 m. *Williams 5735* (F)—Huánuco: Prov. Pachitea, Distr. Honoria, mouth of the Río Pachitea, *Raphael Lao M.* 56 (fl.), 90 (fr.). "Quinilla, quinilla colorada."

Chrysophyllum Michino H.B.K. Nov. Gen. et Sp. 3: 236. 1818 described on sterile material, and never more discovered, very probably pertains to this species ("Provinciae Bracamorensis, prope Cavico et Matara") *Humboldt & Bonpland 3589.*

MASTICHODENDRON Cronq.

References: Lam, Rec. Trav. Bot. Néerl. 36: 521. 1939; Dugand, Caldasia 4: 427. 1947; van Royen, Blumea 10: 122. 1960; Aubréville, Adansonia 3: 32. 1963; Baehni, Boissiera 11: 126. 1965.

Sideroxylon sect. *Mastichodendron,* Engler, Bot. Jahrb. 12: 496. 1890; *id.* in Engler & Prantl, Pflanzenf. 4, 1: 144. 1891.

Trees; inflorescences simple—sometimes apparently branched—ramiflorous; flowers pentamerous, calyx without appendices, corolla bell-shaped with a short tube, staminodes present; fruit indehiscent, 1-seeded (rarely 2–3, free), scar short, basilar or basi-lateral, embryo vertical.

Mastichodendron Williamsii (Baehni) Baehni ex Bernardi, Candollea 22: 231. 1967. *Sideroxylon Williamsii* Baehni, Candollea 7: 135. 1936.

Tree 20 m., with large crown, and diameter 50–75 cm.; branchlets slender grisaceous, puberulous at the tip. Leaves coriaceous, elliptic, obtusely cuspidate (acumen up to 5 mm. at maximum), acute at the base, glabrous above, sparsely pilose beneath; secondary veins very numerous and parallel, very thin above, quite obsolete beneath; 5–8 cm. long, 2.5–3 cm. wide, petioles 6–10 mm. Flowers (seen only in a young stage) 3–5 in the axils of the persistent leaves; pedicels 3 mm. long; calyx pentamerous, quincuncial, sepals orbicular, rufous-pubescent on the back, silky inside; corolla pentamerous, glabrous,

with tube 1 mm. long and lobes 1.5 mm. high; stamens 5, filaments very short, attached to the throat; staminodes stipitiforme, on the same level, truncate; ovary rufous-hirsute, 5-celled, ovules attached to the lower end; style glabrous, as long as the oxary, black; stigma entire, punctiform. Berry not seen (after Ll. Williams: yellowish at maturity).

Known only from the type. Loreto: Palta Cocha on the upper Río Nanay, *Williams 3198* (F: type).

POUTERIA Aubl.

References: A. De Candolle, Prodr. 8: 165. 1844; Bentham & Hooker, Genera Plant. 1: 658. 1876; Engler, Bot. Jahrb. 12: 514. 1890, in Engl. & Prantl, Nat. Pflanzenfam. 4, 1: 141. 1891; Kuntze, Rev. Gen. 3: 194. 1893; Lam, Bull. Jard. Bot. Buitenzorg, ser. 3, 7: 192. 1925, Rec. Trav. Bot. Néerl. 36: 524. 1939; Record, Trop. Woods 59: 36. 1939; Baehni, Candollea 9: 147. 1942; Lam, Blumea 5: 336. 1943; Cronquist, Lloydia 9: 257. 1946, Brittonia 7: 1. 1948; van Royen, Blumea 8: 207, 235. 1957; Heermann-Erlee & van Royen, Blumea 8: 452. 1957; van Royen, Nova Guinea N. S. 10: 134. 1959; Meeuse, Bothalia 7: 332. 1960; Wood & Channell, Journ. Arn. Arb. 41: 11. 1960; Aubréville, Adansonia 1: 155. 1961; Baehni, Boissiera 11: 48. 1965.

Trees or shrubs; leaves without stipules, venation variable; secondary nerves numerous and parallel or fewer and distant; flowers in umbels or on short axillary axes; sepals (4)-5-(6), without appendix; corolla thin mostly tubular, with (4)-5-(6) lobes; staminodes present. Ovary with generally 4–5 loculi; fruits indehiscent, 3–5-seeded; seeds with a narrow (rarely rather broad) scar; shorter than the seed, embryo vertical.

Calyx 4–5 merous, imbricate or quincuncial.

Leaves with very numerous lateral veins pressed together.

Blades glabrous below.

Flowers sessile (pentamerous) ..... *Pouteria cylindrocarpa.*

Flowers pedicelled.

Blades less than 10 cm. long.

Flowers 4-merous ..... *Pouteria venulosa.*

Flowers 5-merous ..... *Mastichodendron Williamsii.*

Blades more than 12 cm. long, flowers 5-merous. *Pouteria Ulei.*

Blades silky or pilose beneath, flowers pentamerous.

Blades emarginate or rounded at the end, pedicels more than 10 mm. long ..... *Pouteria peruviana.*

Blades long-acuminate, flowers almost sessile.
Pouteria sanctae-rosae.

Blades obovate, short acuminate, pedicels 2–4 mm. long.
Pouteria Duckeana.

Leaves with 10–20 pairs of lateral veins, fairly separated.

Blades glabrous below, except in some instances the hairy midrib and principal veins becoming glabrate with age.

Flowers sessile (pentamerous) ..... *Pouteria validinervis.*

Flowers pedicelled.

Flowers pentamerous (sometimes hexamerous: *Pouteria anibifolia*).

Flowers—excluding pedicels—more than 15 mm. high.
Pouteria lucuma.

Flowers—excluding pedicels—decidedly lesser than 10 mm. high.

Pedicels less than 6 mm. long.

Calyx membranous, less than 2 mm. high, corolla 2.5 mm. high, with rounded lobes.
Pouteria anibifolia.

Calyx fleshy, 4 mm. high, corolla 5–6 mm. high, with triangular lobes ..... *Pouteria Bonneriana.*

Pedicels more than 10 mm. long, fascicled.

Blades with distinct network above; calyx almost glabrous ..... *Pouteria peruviensis.*

Blades with obsolete network above; calyx puberulent ..... *Pouteria Aubrevillei.*

Flowers tetramerous.

Pedicels very short, 1–3 mm.

Calyx glabrous or with very few hairs.

Corolla 4 mm. high.
Richardella glomerata var. *glabrescens.*

Corolla up to 7 mm. high ..... *Pouteria caimito.*

Calyx tomentose.

Corolla 7–9 mm. high ..... *Pouteria torta.*

Corolla 18 mm. high..... *Pouteria Wurdackii.*

Pedicels 5 mm. long or longer.

Pedicels and calyx glabrous, corolla 8 mm. long. *Pouteria pisquiensis.*

Pedicels and calyx densely coppery pilose, corolla 2 mm. high..... *Pouteria loretensis.*

Blades fairly uniformly hairy or silky below.

Flowers sessile, or with short and stout pedicels, 2–4 mm. long.

Flowers pentamerous, very small, 2 mm. high; network not very distinct, flat petioles 5–7 mm. long. *Pouteria tarapotensis.*

Flowers tetramerous, 5–6 mm. high; network quite obsolete, petioles less than 10 mm. long. *Richardella glomerata* var. *glomerata.*

Flowers pedicelled, with pedicels more than 6 mm. long; network quite obsolete; petioles at least 15 mm. long.

Flowers tetramerous..... *Pouteria cinnamomea.*

Flowers pentamerous (sometimes hexamerous). *Richardella macrophylla.*

Calyx pentamerous, valvate; filaments completely free. *Pouteria Bouffardiana.*

Pouteria anibifolia (A. C. Smith) Baehni, Candollea 9: 269. 1942. *Lucuma anibaefolia* A. C. Smith, Bull. Torr. Bot. Club 60: 389. 1933. *Lucuma Batten-Poollii* Benoist, Bull. Soc. Bot. France 84: 636. 1938. *Franchetella anibifolia* (A. C. Smith) Aubr. Adansonia 1: 183. 1961.

Small or medium-sized tree, up to 12 m. high, with slender, terete, glabrous, reddish-brown branchlets, however, furrowed and opaque just at the extremity. Leaves papery, elliptical, acuminate (in Peruvian specimens, acumen well marked, up to 10–15 mm. high), more rarely slightly obovate, often sinuate, glabrous, dull, 12–18 cm. long, 2.5–6 cm. wide; petioles slender, canaliculate, 6–12 mm. long; midrib slightly prominent beneath; secondary nerves in 14–16 pairs, very thin, patent and arching near the margin; tertiary nerves forming a dense but inconspicuous network. Flowers white, fascicled by 5–10, in the leaf axils, or more commonly on short lateral shoots, with acute-triangular and very small bracts at the base of the slender and puberulous, 3–5 mm. long pedicels; calyx 5–6-merous, sepals almost

free, ovate-triangular, the exterior bigger and thicker than the interior, 1–1.5 mm. high, with membranaceous and ciliate margins; corolla campanulate, 2–2.5 mm. high, fleshy, with 5–6 lobes as long as the tube, rounded and ciliate; staminodes fleshy, ovate-acute, near 1 mm. high; stamens apparently fertile, with very short filaments inserted on the upper half of the tube, anthers acute, 0.5 mm. high; pistil much shorter than the corolla, scarcely 1 mm. high, with globose-depressed ovary, more or less densely sericeous, 1-celled, with one ovule attached at the apex of the loculus; style very short (less than 0.25 mm.), conical and obtuse. Fruit olive-like, 2–2.5 cm. long, 8–15 mm. wide; seed ellipsoid, 2 cm. long, with a long and narrow scar.

Type: *Krukoff 1447* (Matto Grosso, Brazil).

Brazil (also cultivated), Peru. Loreto, Florida, Río Putumayo, at mouth of Río Zubineta, alt. 180 m., forest, *Klug 2363* (F, G, S)—San Martín: Juán Jui, Alto Río Huallaga, alt. 400 m., forest, *Klug 3899* (F, S).

Pouteria Aubrevillei Bernardi, Candollea 22: 231. 1967. *Eremoluma Wurdackii* Aubr. Adansonia 5: 197, *t. 1*. 1965, non *Pouteria Wurdackii* Aubr., 1965.

Tall tree, up to 30 m. high, with copious latex and strong greyish branchlets furrowed at the extremities and covered with a rusty, short, appressed pilosity. Leaves obovate, coriaceous, subopposite at the extremity of the branchlets, alternate elsewhere, glabrous except for some scanty and weak hairs along the midrib, short but markedly acuminate, attenuate toward the base and merging finally in the flat petioles 5–10 (15) mm. long; blades 9–12 (16) cm. long, 3–5 (8) cm. wide; midrib strong-prominent beneath; 8–13 pairs of lateral veins, slender and prominulous beneath, ascending and arching, free up to the margin; tertiary veins forming a very fine, prominulous and remarkable network on both faces. Flowers above the leaf scars in several tri-florous fascicles crowded together; pedicels slender, 10–13 mm. long; calyx quincuncial, with 5 sepals connate near the base, the two interior rounded, the others ovate-acute, pilose on the back, puberulous inside, ciliate; corolla campanulate, approximately 5 mm. high, with 5 lobes imbricate, rounded, membranous, 2.5–3 mm. high, ciliolate, rusty puberulous on the back, becoming glabrate, tube short, fleshy, 1.5–2.5 mm. long; 5 fertile stamens with sessile anthers in the type (subsessile in *Wurdack 2478*) inserted on the middle of the tube, 1.5–2 mm. high, apiculate; staminodes 5, fleshy, subulate and very acute, in some instances in the same flower,

one or more expanded and petaloid, 2–3 mm. long; pistil conical, glabrous, scarcely 2 mm. high, with a 1-celled ovary; ovule attached by its superior half; style indistinct, stigma inconspicuous, a little oblique, granulate. Fruit unknown.

Type: *Wurdack 2333* (Dept. Loreto, Peru).

Peru. Loreto: Tree 25 m., flowers cream, rainforest on lower north slopes of Cerro Campanquiz at Pongo de Manseriche, right bank of Río Marañon, alt. 300–550 m. (fl. oct.), *Wurdack 2333* (F). Tree 30 m., flowers white, forested ridge on right bank of Río Santiago 3–4 km. above mouth, alt. 300–350 m. (fl. oct.), *Wurdack 2478* (LE).

Pouteria Bonneriana Bernardi, Candollea 22: 237. 1968.

Medium-sized tree, up to 15 m. high with stout branchlets, chestnut-brown, furrowed and shortly pilose at the extremity. Leaves papery, obovate, less frequently elliptical, alternate to almost opposite, generally with a short and broad acumen, obtuse to cuneate at the base, glabrous above, short and loosely puberulent beneath; midrib impressed above near the petiole, prominent elsewhere, strongly prominent beneath and, with the secondary veins, characteristically red-brown; lateral veins in 15–20 pairs, strongly arched-ascending; veinlets prominent on both sides, forming a dense and somewhat irregular network, more noticeable beneath; petioles puberulent becoming glabrate with age, almost terete, very narrowly canaliculate on the upper face, 35–55 mm. long; blades 20–28 (35) cm. long, 9–11 (13) cm. wide. Fascicles 8–10 (12)-flowered in the axils of the leaf scars, on stout and fairly woody branchlets (at least on the samples at hand; pedicels stout, 3–4 (5) mm. long, sparsely pilose; calyx quincuncial, with lobes almost completely free, sepals nearly orbicular, fleshy, measuring 4 mm., sparsely pilose on the back, the three outer ones hairy on the inner face of the upper margin, the inner ones glabrous inside and with very thin margins; corolla glabrous, fleshy, 5–6 mm. high, campanulate, with lobes imbricate, half as long as the tube, fairly triangular and auriculate at the base; stamens a little shorter than the corolla, with easily distinguishable filaments all along the interior of the corolla, but free only from the middle of the tube, 4 mm. long, ovate anthers 1 mm. high, basifixed; staminodes acute, scarcely 1 mm. high; pistil 4 mm. high, silky-puberulent except for the end of the stout style; stigma very reduced; ovary moderately furrowed, 5-locular; the ovules attached broadly by the middle of their adaxial side. Fruit unknown.

Type: *Wurdack 2470* (Dept. Amazonas, Peru).

Endemic to Amazonian Peru, probably present, too, in Amazonian Brazil, where it could be confused with *Rhamnoluma pariry* (Ducke) Baehni (=*Lucuma pariry* Ducke, *Eglerodendron pariry* (Ducke) Aubréville).—Amazonas: Prov. Bagua, forested ridge on right bank of Río Santiago 3–4 km. above mouth, elev. 300–350 m., *Wurdack 2470* (G, LE).—Loreto: Prov. Alto Amazonas, rainforest on lower southwest slopes of Cerros Campanquiz, right bank of Río Marañon opposite mouth of Río Santiago, elev. 300–450 m., *Wurdack 2514* (F).

Pouteria Bouffardiana Bernardi, Candollea 22: 228. 1968.

Tree 12 m. high known only from the type, branchlets fairly robust, with pale grey bark, glabrous, furrowed at the ends; leaf buds acute, white-pilose when young, finally glabrate. Papery leaves almost coriaceous, entirely glabrous, generally with a rounded apex, rarely obtuse; midrib slender, slightly raised above, more conspicuous and prominent beneath; lateral veins 8–12 pairs, nearly obsolete above, slender and slightly raised beneath, spreading and gradually arched toward the borders; network fairly inconspicuous and lax; petioles fairly thin, shining, glabrous, half-terete (?), not at all canaliculate, 10–15 mm. long. Flowers 3–6 fascicled above the scars of fallen leaves, or 1–2 flowers in the axils of young leaves at the top of the branchlets. The flowers of the same fascicle are in different stages of growth, from buds with short pedicels, to almost opened flowers with elongated pedicels 2–3 mm. long and glabrous; calyx depressed-globose, 3 mm. long and wide, pentamerous, valvate, covering completely the rest of the flower, glabrous on both sides, except the top of the sepals very shortly and minutely white tomentose; sepals almost equilateral triangles in shape, 1.5 mm. long each side, in some instances irregularly opened, giving therefore the false appearance of a trimerous calyx; corolla pentamerous, 2 mm. high, 2.5 mm. wide, fleshy, glabrous with imbricate, triangular petals slightly more than 1 mm. long; stamens 1.25 mm. long with filaments moderately thick, nearly 1 mm. long, completely free from the tube, inserted at the corolla base; pollen-bearing ovate anthers, with a large connective, obtuse at the top; fleshy staminodes, barely 1 mm. long, almost trullate; pistil depressed, scarcely 1 mm. high, 1.5 mm. wide, ovary densely covered with silky-yellowish hairs, style robust, stigma glandular, slightly expanded; 5-locular ovary, small and depressed loculi, ovules attached toward the bottom of the loculi.

Loreto: Gamitana Cocha, Río Mazán, alt. 100–125 m., *Schunke 368* (Type: F, US).

Pouteria caimito (Ruiz & Pavón) Radlk. in Sitzb. Math.-Phs. Cl., Acad. Wiss. Munchen 12: 333. 1882, var. *caimito* [var. *typica* Baehni, Candollea 9: 260. 1942]. *Achras caimito* Ruiz & Pavón, Fl. Peruv. 3: 18, *t. 240.* 1802. *Lucuma caimito* Roem. & Schult. Syst. 4: 701. 1819; Mart. Fl. Bras. 7: 79, *t. 33.* 1863. *Labatia caimito* Mart., Herb. Fl. Bras. p. 170. 1837. *Guapeba caimito* Pierre, Not. Bot. Sapot. p. 42. 1891. *Lucuma ternata* H.B.K. Nov. Gen. & Sp. 3: 241. 1818. *Lucuma huallagae* Standl. ex Williams, Field Mus. Publ. Bot. 15: 411. 1936. *Pouteria leucophaea* Baehni, Candollea 18: 176. 1962.

Large tree, up to 35 m., more frequently 10 m. high; branchlets blackish, sparsely puberulous or glabrate, furrowed. Leaves variable, in the Peruvian samples mostly chartaceous and elliptical, but also coriaceous, obovate, acuminate or widely cuspidate, strongly attenuate at the base, glabrous or with a few dispersed hairs, 10–20 cm. long, 3–6 cm. wide; petioles 5–20 mm. long, canaliculate; midrib prominent beneath; secondary veins in 9–12 pairs, patent and arcuate, slender; tertiary veins forming a very fine network, prominulous beneath. In the herbarium samples, the leaves are nearly black above, and reddish beneath. Flowers solitary or 2–5 in the axils of leaves or above the leaf scars, sessile or with a very short pedicel (1 mm.); sepals 4 (5), ovate, glabrous inside, the outer ones smaller, up to 4 mm. long, almost glabrous on the back, the inner ones sparingly silky, 6 mm. long; corolla cylindric, white or greenish-white, 5–8 mm. long; lobes 4 (5), rounded, ciliate on the margin, 1–2 mm. long; staminodes subulate or lanceolate, sometimes slightly ciliate, a little shorter than the lobes; filaments attached to the middle of the tube, 2 mm. long; anthers 1 mm. long, apiculate; pistil a little longer than the corolla, with a small, globose ovary 2 mm. high, style 6 mm. long, slender, stigma inconspicuous, 4-tuberculate; ovary densely rufous-hirsute, 4-celled, with ovules attached at the bottom of the locules. Berry edible, globose to cylindrical, obtuse or apiculate, 4–5 cm. in diameter, tomentose when young; seeds 1–4, cylindric-ovoid, slightly compressed on the sides, scar somewhat shorter than the seed.

Type: *Ruiz & Pavón s/n*: "Habitat in Andium montibus imis calidis et cultis ad Pozuzo et Chinchao" (Huánuco) (G).

Cultivated for the fruits in all tropical America. Loreto: Mishuyacu, near Iquitos, 100 m. dense forest, *Killip & Smith 29993* (F). Distrito de Iquitos, fundo Indiana, 110 m., planted, *Mexia 6397*

(G, S). Lower Río Nanay, *Williams 472* (F), *695* (G). Pebas on the Amazon River, *Williams 1792* (F). Pró on the Amazon River, *Williams 1983* (F). Lower Río Huallaga, *Williams 4802* (F) "*Lucuma huallagae* Standl." (F, G); ibidem: *Williams 4717* (F, G). Santa Rosa, lower Río Huallaga below Yurimaguas, alt. about 135 m. dense forest, *Killip & Smith 28778, 28798* (F).—Amazonas: Forested ridge of Río Santiago, 2–3 km. above mouth, 300–350 m., *Wurdack 2408* (G, S).—Junín: La Merced, 650 m., *Macbride 5584*. Puerto Bermudez, alt. about 375 m., dense forest, *Killip & Smith 26564* (F) "*Lucuma huallagae.*"—San Martín: Juan Juí, Alto Río Huallaga, about 400 m. forest, *Klug 3822* (F, S) (*Pouteria leucophaea* Baehni). Without locality, Ruiz & Pavón (G: 3 specimens).

Pouteria cinnamomea Baehni, Candollea 9: 252. 1942. *Labatia discolor* Diels, Engl. Bot. Jahrb. 37: 601. 1906, non *Pouteria discolor* (Baill.) Baehni.

Tree 20 m., branchlets robust, reddish brown, a little compressed at the ends, rusty-tomentose. Leaves papyraceous, obovate, indistinctly apiculate, tapering toward the base, pubescent along the upper face of the midrib when young, cinnamon coloured, densely silky-tomentose below, 10–15 cm. long, 4–5 cm. wide; petioles stout, above flat, approximately 15 mm. long. Flowers 5–6-fasciculate in the axils of leaves, only female observed; pedicels coppery-silky, robust, 8–10 mm. long; sepals 4, almost completely free, the two outer thick, coriaceous, silky outside, ovate, 6 x 4 mm.; the inner glabrous and only 3 mm. large, ovate-elliptical; corolla whitish-green, rather fleshy, 5–6 mm. long; lobes 4, ovate, margins ciliolate, shorter than the tube; staminodes tongue-like, petaloid, fleshy in the basal portion adnate to the corolla tube, shorter than the lobes; stamens, in all the flowers observed, reduced to linear filaments, 3 mm. long, attached to the inferior part of the tube; pistil pear-shaped, 5–6 mm. high, almost completely covered by long coppery sericeous hairs, except the top end of the style, stigma inconspicuous; ovary 1–1.5 mm. high, 4-locular, with ovules attached by the middle of their adaxial side. Fruit not seen.

Type: *Weberbauer 5030.*

Known only from the type collection. Cuzco: Convención, 1,700 m., *Weberbauer 5030.*

Pouteria cylindrocarpa (Poepp.) Baehni. *Sideroxylon cylindrocarpon* Poepp. in Poepp. & Endl. Nov. Gen. & Sp. 3: 72, *t. 282.* 1845.

Micropholis cylindrocarpa (Poepp.) Pierre, Not. Bot. Sapot. p. 40. 1891. *Pouteria saltuensis* Baehni, Candollea 18: 171, *fig. 60*. 1962.

Shrub or small tree (up to 10 m.); branchlets slender, rufous-puberulous and angled at the extremities. Leaves papyraceous, elliptic, glabrous on both sides, 7–9 cm. long, 2.5–3 cm. wide, long and abruptly acuminate (acumen up to 12 mm. long), glabrous, with very numerous secondary, parallel veins straight and patent, spreading from the midrib which is prominent beneath; petioles slender, deeply canaliculate, 8–10 mm. long. Flowers sessile or with very short pedicels, solitary or in pairs in the axils of leaves; sepals 5, quincuncial, thick coriaceous, pubescent outside, puberulous inside near the edges, 2 mm. long; corolla glabrous, 2.5 mm. long, with 5 small rounded lobes; staminodes lanceolate, half as long as the lobes, stamens small, with very short filaments attached in the inferior half of the tube, anthers heart-shaped; ovary 4–5-celled, hirsute, with the ovules attached on the upper part of the locules. Berry cylindrical (ex Poeppig) or egg-shaped, apiculate, 1–1.5 cm. long, 1-celled, 1-seeded.

Dpto. Loreto: Forests of Yurimaguas, *Poeppig 2371* (type G). Mishuyacu, near Iquitos, 100 m. alt., *Klug 1104* (F). Between Yurimagus and Balsapuerto (lower Río Huallaga basin), 135–150 m., dense forest, *Killip & Smith 28011* (type of *Pouteria saltuensis*), 28150, 28257, 29021 (F). La Victoria, on the Amazon River, *Williams 2995* (F, G).

Pouteria Duckeana Baehni, Candollea 18: 161, *f. 53*. 1962. *Micropholis apiculata*, Gilly, Sched. Herb.

Medium-sized tree, rarely attains more than 20 m. height, with brown, stout and upright branchlets compressed, covered with a rusty-red appressed pilosity at the extremities. Leaves fairly coriaceous, elliptical to obovate, more or less abruptly acuminate at the tip, acumen from 5 to 20 mm. high, base generally acute, glabrous on the upper side, densely red-silky beneath, becoming almost glabrate with age; blades (12)–15–(20) cm. long, (6) 8 (12) cm. wide; petioles stout, canaliculate, 15–25 mm. long, shortly and densely pilose; midrib strong, prominent beneath; secondary veins slender, numerous, parallel, inconspicuous. Flowers in the axils of the leaves, on very short shoots 3–5-flowered; robust pedicels rusty-red, silky, 2–4 mm. long; calyx quincuncial with two thick external sepals, broadly-ovate, densely rusty pubescent on the back and pilose inside, the remainder thinner, broadly obovate, silky, ciliate at the edges, 3–4 mm. long; corolla tubular 4–5 mm. long, with 5 obtuse lobes, slightly auriculate,

2 mm. high; stamens attached to the throat, with short filaments; anthers ovate, short, included; staminodes fleshy, subulate, shorter than the lobes; pistil 3 mm. high, with depressed ovary, hirsute at the base only, 5-celled, style stout, stigma inconspicuous; ovules attached by the middle of their adaxial side. Fruit unknown.

Type: *Ducke 24853*, Manaos, Amazonia, Brazil (G).

Brazil, Peru. Loreto: Tierra doble on the Río Nanay, *Williams 910* (F, G).

Called *Balata quebradiza* in the vernacular.

Pouteria loretensis Baehni, Candollea 9: 235. 1942.

Tree (?); branchlets fairly robust, terete, compressed at the ends, pubescence appressed. Leaves coriaceous, glabrous, glossy beneath, obovate, shortly but abruptly acuminate (acumen up to 5 mm. long), attenuated gradually toward the petiole, 10–12 cm. long, 3.5–5 cm. wide; petioles stout, 5 mm. long; midrib fairly prominent and robust on both sides; lateral veins very slender in 13–16 pairs, patent, only slightly arched toward the border; veinlets and network quite obsolete. Flowers in fascicles of 3–5 on slender, sulcate, rusty-puberulous branchlets 5–10 cm. long, bearing few leaves; pedicels fairly robust, 6–7 mm. long, pubescence coppery and appressed; sepals 4, 2 outer ones thick and broadly ovate, with a coppery pilosity on both sides, 2 inner ones pubescent outside with very few sericeous hairs down the center and with scarious and ciliate margins; corolla 2 mm. long, glabrous, lobes 4, rounded, slightly shorter than the tube; stamens perfect, with short thick filaments attached to the middle of the tube, U-shaped, fertile anthers cordate, 1 mm. long; staminodes subulate, subacute, half as long as the lobes; pistil almost 2 mm. high, ovary depressed globose and coppery-silky, 2-celled, with loculi high and narrow, ovules attached to the central portion; style fairly slender, 0.5 mm. long, stigma quite obsolete. Berry unknown.

Type: *Tessmann 5451*.

Known only from the type collection. Loreto: Middle Ucayali, Yarina Cocha, *Tessmann 5451* (G, S).

For the vegetative organs, and also for the floral morphology, this species is fairly similar to *Pouteria lateriflora* (Benth. ex Miq.) Radlk. (=*Pseudocladia lateriflora* Pierre); but in *Pouteria loretensis* the pedicels and flowers are notably more robust; the ovule insertion being different also (in *P. lateriflora* it is completely basal), it is easy to separate the two taxa.

Pouteria Lucuma (Ruiz & Pavón) O. Ktze. Rev. Gen. 3, 2: 195. 1898. *Achras lucuma* Ruiz & Pavón, Flora Peruv. 3: 17, *t. 239*. 1802. ? *Lucuma bifera* Mol. Saggio Chile p. 187. 1782, French ed. p. 161. 1789. ? *Lucuma turbinata* Mol., l.c. ? *Lucuma obovata* H.B.K. Nov. Gen. 3: 241. 1818; A. DC. Prodr. 8: 172. 1844 (with var. *ruizii*); Mart. Fl. Bras. 7: 69. 1863. *Pouteria insignis* Baehni, Candollea 9: 356. 1942. *Richardella Lucuma* (Ruiz & Pavón) Aubr. Adansonia 1: 175. 1961; Adansonia, Mémoire 1, p. 41, *fig. 15*. 1964.

Medium-sized tree, 6–15 m. high; branchlets greyish-white appressed-pilose, terete. Leaves coriaceous, rarely papery, obovate, with generally rounded tip, in some instances subacute or obtusely acuminate, acute at the base, glabrous, 10–20 cm. long, 5–8 cm. wide; petioles 1.5–4 cm. long; midrib robust and prominent beneath, veins 9–12 (14) pairs, patent or arcuate-ascending, slender. Flowers single or by 2–3 in the axils of the leaves; pedicels stout, rusty pubescent, 8–15 mm. long; calyx pentamerous, quincuncial, with sepals ovate, obtuse, rusty-pubescent, the inner ones thinner and with the edges glabrate outside but ciliolate, glabrous, or slightly pubescent inside near the tip, 8–12 mm. long, 6–8 mm. large; corolla yellowish-green, fleshy, up to 15 mm. long, lobes 5, ovate, shorter than the tube (7–8 mm. long), slightly puberulous outside and papillose at the margin; perfect stamens with filaments attached to the throat, 1 mm. free, 3 mm. adnate to the tube, anthers ovate, basifixed, 3 mm. long; staminodes linear-subulate, papillose, 3 mm. long; pistil, at anthesis, as long as the corolla, elongate-conical, ovary up to 7–8 mm. high, yellow-sericeous at the base only (3–4 mm.), 5 (4)-locular, loculi small, locular cavities restricted to the upper portion of the ovary, ovules attached to the top of the narrow loculi, style slender, papillose, slightly 5-furrowed, stigma obscurely 5-tuberculate. Berry edible, apple-shaped, apiculate or depressed, glabrous, dark green; seeds 1–5, ovoid or spherical, scar large, ovate, almost as long as the seed.

Type: *Ruiz & Pavón s/n*, Peru (G).

Peru, Ecuador, cultivated in Chile, Costa Rica. Loreto: along Río Itaya, *Williams 189* (F); Tierra doble on the Río Nanay, *Williams 904* (F); Mishuyacu, near Iquitos, 100 m. forest, clearing, *Klug 1515* (F).—Cajamarca: Prov. Cutervo, Socota common along river and in fencerows, alt. 2,800 m., *Stork & Horton 10154* (F, G).—Ayacucho: Aina between Huanta and Río Apurímac, clearing, alt. 750–1,000 m., *Killip & Smith 22818* (F); Maria del Valle probably an escape, alt. 2,300 m., *Macbride 4953* (G).—Cuzco: Ol-

lantayambo, alt. 3,000 m., *Cook & Gilbert 471, 472, 474* (F).—Without locality: *Dombey 410* (G); *Pavón 585* and without number (G).

Pouteria peruviana Baehni, Candollea 9: 214. 1942. *Lucuma macrophylla* Krause, Verhandl. Bot. Ver. Brandenburg 1908 (L): 94. 1909. Non *Pouteria macrophylla* (Lam.) Eyma (1936).

Tree 6 m. (collected only once); branchlets robust, glabrous, terete, brown. Leaves thick coriaceous, oblong or obovate-oblong, rounded or emarginate at the apex, gradually attenuated in the stout, dilated petiole, 20–25 mm. long, subcanaliculate; blade 16–20 cm. long, 6–8.5 cm. wide, glabrous and shining above, coppery dense appressed pubescent beneath, becoming glabrate with age; midrib very prominent beneath; secondary nerves numerous, patent, parallel, slender. Flowers conspicuous, 4–8 above the leaf scars, pedicels stout, 12–16 mm. long, short rusty-pilose; sepals 5, almost completely free, very thick-coriaceous, quincuncial, rusty-pilose on the back, glabrous inside, 5–7 mm. long, 3–4 mm. large, thin-edged, especially the two inner ones, corolla tubular, fleshy, 8–10 mm. long, with 5 lobes ovate, 3 mm. high; fertile stamens erect and exserted, attached to the throat, with filaments 5 mm. long, anthers narrow, 2 mm. high; staminodes subulate, 2 mm. long; pistil shorter than the corolla, 4–5 mm. high, ovary conical, brown, hirsute, 5-celled, ovule attached to the top of the loculus; style as long as the ovary, glabrous, stigma obsolete. Fruit unknown.

Loreto: Cerro de Escalero, 1,200 m.; *Ule 6793* (type: G).

Pouteria peruviensis (Aubr.) Bernardi, Candollea 22: 231. 1961. *Eremoluma peruviensis* Aubr. Adansonia 5: 199. 1965.

Medium-sized tree (collected only once) up to 15 m. high with dark branchlets sparsely puberulous at the extremity, a little compressed. Leaves subcoriaceous, glabrous, elliptical and acuminate, with acumen well marked, 10–15 mm. long, attenuate toward the base, gradually passing into the slender, glabrous, and in part canaliculate petiole, 8–12 mm. long; midrib fairly strong and prominent on both sides; secondary veins thin, somewhat irregular arched-ascending, in 9–13 pairs, joining near the margins; frequent and slender veinlets forming a dense, peculiar network prominulous on both sides. Flowers fasciculate, 5–10 in the axils of the leaves, pedicels thin, however, thickening below the calyx, sparsely puberulous; sepals 5, quincuncial, nearly orbiculate, measuring 3 mm., very fleshy and thick at their base, slightly membranaceous at the borders,

sparsely pilose on the back, glabrous inside, obscurely ciliolate, imperceptibly connate at their bases; corolla nearly 5 mm. high, glabrous, membranaceous, campanulate, with 5 lobes up to 4 mm., nearly orbiculate, presenting dark and numerous veinlets; fertile stamens 5, inserted on the throat, anthers sessile, ovoid, erect, apiculate, 1 mm. high; staminodes 5, subulate, acute, 2–3 mm. long; pistil conical, much shorter than the corolla, 2 mm. high, glabrous, the broad style merging with the top of the ovary, stigma punctiforme; ovary 1-celled, with one ovule broadly attached by the adaxial face at the upper part of the loculus. Fruit unknown.

Type: *Wurdack 2363.*

Known only from the type: Loreto: Alto Amazonas, rainforest on lower north slopes of Cerros Campanquiz at Pongo de Manseriche, right bank of Río Marañon, alt. 300–350 m., *Wurdack 2363* (F).

Pouteria pisquiensis Baehni, Candollea 9: 263. 1942.

Medium-sized tree, with a trunk 30 cm. in diameter (collected only once), branchlets terete, glabrous, black at the ends only, otherwise whitish. Leaves glabrous, membranaceous, obovate, indistinctly acuminate or subacute or obtuse, cuneate at the base, 8–10 cm. long, 3–4 cm. wide, petioles thin, flat on the upper side, 1–2 cm. long; midrib scarcely prominent beneath; 8–10 pairs of arcuate-ascending, slender lateral veins, forming with the tertiary veins a fine network, prominulous beneath, obsolete on the upper side. Flowers 2–5 in the leaf axils; pedicels 10 mm. long, thin and little compressed at the base, swelling gradually toward the calyx; sepals 4 (4 x 4 mm.), the two exterior large-ovate and fleshy, glabrous, the interior ones almost orbiculate, ciliolate, scariose near the edges; corolla tubular, 6 mm. long; lobes 4, oblong-ovate, truncate, minutely papillose, 2.5 mm. high; staminodes narrowly oblong, obtuse, papillose, scarcely 2 mm. high; fertile stamens included, with filaments flat, 3 mm. long, attached near the base of the tube, anthers dorsifixed, narrow, apiculate, 1 mm. high; pistil of the same length as the corolla, ovary very small, only 1 mm. high, hirsute, 4-locular, with ovules attached near the base of the loculi; style glabrous, slender, smooth, stigma obscurely capitate. Fruit unknown.

Dept. Loreto: Ucayali territory, between 10° S and its estuary, Río Pisqui, alt. 150 m., *Tessmann 3103*, type (G).

Pouteria sanctae-rosae Baehni, Candollea 9: 211. 1942.

Tree 12–15 m., branchlets robust and terete, compressed, grooved and covered with a dense, ochre-yellow pilosity at the ends. Leaves oblong, coriaceous, abruptly mucronate (mucro narrow and fragile, 5–8 mm. long), cuneate at the base, glabrous and shining above, dense, ochre-yellow pilosity below, midrib a little impressed above, stout and very prominent below, secondary veins very numerous, patent and straight except near the border, where they are arched, more conspicuous beneath. Short shoots bearing many flowers, above the leaf-scars; flowers covered with ochre-colored hairs; pedicels less than 1 mm. long or absent; calyx pentamerous, quincuncial, sepals almost free, 2 x 2 mm., the exterior coriaceous and uniformly thick, ovate and acute, hirsute on the back, the interior ones almost orbiculate, thinner near the ciliolate edges, glabrous inside; corolla glabrous, fleshy, a little exserted, 3.5–4 mm. high, tubular, lobes 5, broad-ovate, only 1 mm. high; staminodes petaloid, ovate, roundish, almost auriculate, half as long as the lobes, filaments short, attached to the throat, anthers not seen; pistil as long as the corolla, ovary globose and sericeous, 2 mm. high, 5-celled, the ovules attached at the middle or a little above. Young berry cylindrical, densely hirsute.

Type: *Killip & Smith 28799.*

Known only from Peru. Loreto: Santa Rosa, lower Río Huallaga, below Yurimaguas, *Killip & Smith 28799* (F, G), *28094* (F).

Pouteria tarapotensis (Eichl. ex Pierre) Baehni, Candollea 9: 273. 1942. *Lucuma tarapotensis* Eichl. ex Pierre, Not. Bot. Sapot. 24. 1890. *Franchetella* sp. Pierre, l.c. *Franchetella tarapotensis* (Eichl. ex Pierre) Baillon, Hist. des Pl. XI: 291. 1892; Aubréville, Adansonia 1: 183. 1961.

Tree or small shrub with slender, red-brown branchlets compressed and appressed—with sericeous extremities. Leaves chartaceous, obovate-acuminate, attenuate toward the cuneate base, undulate at the margin, sparingly pilose or glabrate above, more or less densely silky or pilose below, 9–13 (16) cm. long, 3.5–5 (7) cm. wide; petioles semiterete, silky, 5–7 mm. long; midrib moderately prominent below, 10–12 pairs of secondary veins ascending and arching toward the margin, prominulous beneath; network of tertiary veins more or less loose and prominulous on both sides. Flowers crowded 5–8 in the axils of the leaves, quite small, rusty pilose, subsessile or with indistinct and very short pedicels, less than 0.5 mm. long; calyx quincuncial with sepals

connate for one-third of the entire length, appressed rusty-silky on the back, ovate, acute, thick, the two outermost pilose inside near the extremity, the others glabrous inside, nearly 2 mm. high; corolla tubular, thin, glabrous, only 2 mm. high, with 5 rounded lobes as long as the tube; fertile stamens (in the type) with short filaments inserted halfway up the tube, or a little higher, anthers ellipsoid or ovoid, 0.5 mm. high, staminodes triangular, fleshy, scarcely 0.5 mm. high; pistil only 1 mm. high, glabrous, with base enlarged, fleshy and ring-shaped when young, nearly conical later, with one-celled ovary and one ovule inserted at the apex of the loculus; style attenuate to the small granulose stigma. Berry oliviform, 20–25 mm. high, 7–9 mm. wide, brown appressed pilose, with navicular seed compressed, 18 mm. high, 7 mm. broad with scar completely covering the compressed adaxial face.

Type: *Spruce 4561*.

Peru (Ecuador, Brazil ?). Loreto: Between Yurimaguas and Balsapuerto, lower Río Huallaga basin, alt. 135–150 m., dense forest, *Killip & Smith 28228* (F). Lower Río Huallaga, edge of forest, *Williams 3876* (F). Near Tarapoto, *Spruce 4561* (G, F: fragment).

Pouteria torta (Mart.) Radlk. Sitzb. Math.-Phys. Cl. Akad. Wiss. Munchen 12: 333. 1882. *Labatia torta* Mart. Herb. Fl. Bras. 174. 1837. *Lucuma torta* (Mart.) A.DC. Prodr. 8: 167. 1844; Mart. Fl. Bras. 7: 74, *t. 31*. 1863. *Guapeba torta* (Mart.) Pierre, Not. Bot. Sap. 43. 1891. *Lucuma dolicophylla* Standley ex R. E. Shultes, Bot. Mus. Leafl. Harv. Univ. 13: 289. 1949; Field Mus. Publ. Bot. 15: 411. 1936.

Ligneous plant very variable in size from a little shrub to a tree up to 25 m. high; branchlets robust, greyish or rusty tomentose, becoming glabrate, with large and prominent leaf scars, terminal bud woolly. Leaves elliptical or obovate-oblong, papery, with a very variable extremity: rounded, obtuse, or acute, the base slightly rounded or subacute, sparsely puberulous above, becoming glabrate and shining, frequently greyish or rusty-pubescent beneath, more densely along the veins, the tomentum not persistent; in several instances, adult leaves were almost glabrous; midrib very strong and prominent beneath, lateral veins in 14–28 pairs, patent-arched, prominulous above, prominent beneath; tertiary veins forming a dense and somewhat regular network; blades 12–15 (30) cm. long, 6–12 cm. wide; petioles strong, ligneous, terete or semiterete, never canaliculate, 10–30 mm. long. Flowers in the axils or above the leaf scars,

frequently almost completely covering the end of the branchlets, rusty-tomentose all over; pedicels short, 1–2 mm. long; calyx tetramerous, sepals almost free, the two exterior ovate, 4–5 mm. high, tomentose on the back, glabrous inside; the interior, large elliptical, up to 6 mm. long, sericeous on the back, glabrous inside, ciliolate, glabrate and thinner near the borders; corolla tubular, glabrous, 7–9 mm. long with lobes rounded, 2–3 mm. high, patent, ciliolate; staminodes triangular acute or subulate, half as long as the lobes; stamens included in the corolla, with filaments attached to the middle of the tube, 2–3 mm. long, with anthers 2–5 mm. high; pistil a little longer than the corolla, with ovary small, globular, 1–2 mm. high, hirsute with long and erect hairs, (3)–4-celled, ovules attached to the bottom of the loculi; style slender, 8 mm. long, stigma obsolete. Berry ovoid, obtuse, somewhat wrinkled, short-hirsute, 3–3.5 cm. long, 2–2.5 cm. wide, one seeded, nearly 2 cm. long, with scar 5 mm. wide and as long as the seed.

Type: *Martius s/n*, Serro Frio, Minas Gerais, Brazil.

Brazil, Peru, Paraguay, Bolivia. Loreto: Timbuchi on the Río Nanay, *Williams 886* (F). Lower Río Huallaga, *Williams 4951* (F). Region of the Río Ucayali from 10° South to its mouth, *Tessmann 3192* (G, S). Gamitana Cocha, Río Mazan, alt. 100–125 m., *J. M. Schunke 56* (F). Río Jurúa (Peru or Brazil ?), *Ule 5163* (G).—Huánuco: Prov. Huánuco, Las Palmas, river shore, *Asplund 12968* (S).

Pouteria Ulei (Krause) Baehni, Candollea 9: 217. 1942. *Sideroxylon Ulei* Krause, Verhandl. Bot. Ver. Brandenb. 50: 95. 1909. *Micropholis Ulei* (Krause) Eyma, Rec. Trav. Bot. Néerl. 33: 198. 1936. *Sideroxylon Quinilla* Standl. ex Williams, Field Mus. Publ. Bot. 15: 414. 1936. *Pouteria Klugii* Baehni, Candollea 14: 76. 1952.

Tree, tall or medium-sized; branchlets slender, terete, glabrous, greyish; leaves membranous, glabrous, elliptical or oblong-elliptic, in some instances obovate, sharply acuminate, with a 10 mm. long point, blades 8–15 cm. long, 4–5 cm. wide, frequently undulate at the edges, petioles 8–12 mm. long, deeply canaliculate; midrib strong prominent beneath, lateral veins very numerous, parallel and slender, filling the entire surface. Flowers in few-flowered fascicles (2–5) in the axils of the leaves or leaf scars; pedicels slender, 4–6 mm. long, covered with a rusty-red pilosity; calyx quincuncial, sepals 2.5 mm. high and wide, with very thick outer ones, broadly ovate, with rusty-red pilosity on the back, glabrous inside; inner sepals very thin, glabrous along the edges; corolla glabrous, tubular-campanulate, almost

3 mm. high, with 5 rounded lobes, shorter than the tube; 5 stamens inserted on the throat, with very short filaments widened at the base, and small anthers; staminodes fleshy, ovate, shorter than the lobes; pistil conspicuous, conical, almost completely glabrous, 3–3.5 mm. high, with ovary quite indistinct from the large style, which ends in the small, obscurely 5-lobed stigma; the ovary, however, is densely hairy, 5-celled; loculi small and narrow, ovules attached by the upper part of their adaxial side (face). Fruit, in the herbarium samples, almost woody, ovoid, light brown and opaque, 25 mm. high, 18 mm. wide, with 1–2 (more ?) seeds 20–23 mm. long, 6–8 mm. wide and 3 mm. thick; scar narrow (3 mm.) and extended for the entire length of the seed.

Type: *Ule 516a*: Brazil, Río Juruá, Marary (G).

Brazil, Peru. Loreto: Vicinity of Iquitos, hacienda Soledad on Río Itaya, inundation belt of the river, *Asplund 14485* (S). Mishuyacu, near Iquitos, alt. 100 m., *Klug 130* (F, G). Along Río Itaya, *Williams 20, 191* (F). Santa Rosa, lower Río Huallaga below Yurimaguas, dense forest, alt. 135 m., *Killip & Smith 28801* (F). Lower Río Huallaga, Santa Rosa, *Williams 4903* (F, S), idem. *Williams 5089a* (F).

Pouteria validinervis (Sleumer) Baehni, Candollea 9: 363. 1942. *Lucuma validinervis* Sleumer, Notizbl. Berlin 15: 383. 1941.

Medium-sized to tall tree (ex Klug) up to 25 m. (ex typo); branchlets robust, angular-compressed and puberulous at the extremities. Leaves obovate, shortly acuminate or rounded or even slightly emarginate, cuneate at the base, subcoriaceous, entirely glabrous, with blades 12–18 cm. long, 5.5–8 cm. wide, petioles glabrous, stout, quite flat above, 2–2.5 cm. long; midrib large and prominent beneath, lateral veins in 11–14 pairs, straight and almost parallel, except near the border where they are curved; tertiary veins starting from the midrib at almost 90°, uninterrupted, forming a very slender but peculiar reticulation. Flowers cream-colored, in the axils of leaves or above the scars, clustered by 5–10, almost sessile, or with a very short pedicel; calyx pentamerous and quincuncial, with very thick external sepals, almost orbiculate and rusty-pilose on the back, glabrous inside, 3 mm. wide; the interior ones, smaller (2 mm. wide), thinner and with scarious border; corolla fleshy, tubular-campanulate, near to 4 mm. long, with 5 lobes quincuncial, ovate and obtuse, glabrous at the margin, a little longer than the tube; staminodes subulate,

almost as long as the lobes; stamens fertile with filaments 1.5 mm. long, enlarged at the base, attached to the throat, anthers oblong, apiculate, 1 mm. long, extrorse, dorsifixed, included; pistil a little shorter than the corolla, 3 mm. high, ovary ovoid, puberulous, 5-celled, ovules attached adaxially at the middle; style stout, glabrous, furrowed, stigma slightly enlarged and warty. Fruit unknown.

Ecuador, Peru. San Martín: Juan Jui, Alto Río Huallaga, alt. 400 m., forest, *Klug 3785* (F, S).

The Peruvian plant differs in several points from the description of the type (*Herta Schultze Rhonhoff 2873*, Ecuador), cf. Sleumer l.c. In the opinion of the late Prof. Baehni, however, these small differences do not justify a varietal segregation.

Pouteria venulosa (Mart. & Eichl.) Baehni, Candollea 9: 195. 1942. *Sideroxylum venulosum* Mart. et Eichl. ex Miq. in Mart. Fl. Bras. 7: 52, *t. 20, fig. 2, t. 37, fig. 4*. 1863. *Micropholis venulosa* (Mart. & Eichl.) Pierre, Not. Bot. Sap. 40. 1891. *Micropholis calophylloides* Pierre, l.c.; Dubard, Ann. Mus. Col. Marseille 20: 71. 1912. *Meioluma guyanensis* Baill. Hist. Pl. 11: 284. 1891. *Micropholis mucronata* Pierre in Urb. Symb. Ant. 5: 112. 1904. *Pouteria polyneura* Baehni, Candollea 7: 133. 1936; ibid. 9: 194. 1942. *Pouteria flava* Baehni, Candollea 18: 164, *fig. 56*. 1962. *Xantolis venulosa* (Mart. & Eichl.) Baehni, Boissiera 11: 24. 1965.

Medium-sized or tall tree, from 15 to 40 m. high (60 m.? see *Krukoff 6657*); branchlets slender, rough, greyish, compressed and rusty pilose at the ends. Leaves chartaceous, elliptic to oblong-elliptic, sometimes ovate, rarely obovate, long acuminate, base variable, glabrous except on the main nerve rusty pilose below, 4–10 (12) cm. long, 2–4 cm. wide, petioles rusty pubescent, slightly canaliculate, 2–5 mm.; midrib very thin, raised above, and fairly prominent below, lateral veins thin, numerous, parallel, close together, a continuous marginal nerve is present along the whole border. Flowers fascicled 6–10 (20) in the leaf axils, with brown-silky pedicels 2–5 mm. long; calyx tetramerous with almost completely free, large ovate, almost orbicular sepals, the external thicker and bigger, 2 mm. high, hairy on the back and ciliolate, glabrous inside; corolla tetrameous, fleshy and glabrous, 2–3 mm. long, lobes rounded, slightly shorter than the tube; filaments very short, attached to the throat, anthers cordate, very small; staminodes ovate, half as high as the lobes; pistil shorter than the perianth, ovary globular, hirsute, style approximately the same

length, stigma obsolete; ovary 4-celled, ovules attached at the middle of their ventral side. Berry ellipsoid, mucronulate, woody, 10–20 mm. long, 8–10 mm. thick; seed one, ovoid, laterally compressed; scar linear, as long as the seed.

Type: *Spruce 3506* "Ad flumen Guainia vel Río Negro supra ostium fluminis Casiquiari," Venezuela.

Colombia, Venezuela, Guianas, Brazil, Peru. Loreto: Mishuyacu, near Iquitos, 100 m. alt., forest, *Klug 1376* (F). Palta Cocha on the upper Río Nanay, *Williams 3187* (F).—Huánuco: Prov. Pachitea, Distr. Honoria, *Salazar 1* (F).

I agree with the arguments of Prof. Aubréville about the genus *Xantolis* (cf. Adansonia 6: 191–192. 1966) and I think that this species, on the basis of its floral morphology, cannot be included in the old world genus *Xantolis* (see also: van Royen, Blumea 8: 207–233. 1957 and Aubréville, Flore du Cambodge etc. n° 3: 74–83, *t. 13*. 1963).

However, the controversial genus *Micropholis*, as envisaged recently by the same Prof. Aubréville (Adansonia 1: 176. 1961) (and also by Cronquist, Lloydia 9: 252. 1946) would comprise only species with pentamerous flowers; *Pouteria venulosa* on the other hand is strictly tetrameous—contrary to the inexact statements of Miquel in Martius, Fl. Bras.; thus, the species in question, according to Aubréville's arguments, is not *Micropholis*, though all the vegetative characters point toward that concept. The genus *Paramicropholis* Aubr. et Pellegr. (Adansonia 1: 171. 1961) has tetrameous flowers, but quite different fruits; the old genus *Gomphiluma* Baill., placed by the late Prof. Baehni in *Pouteria*, has also tetrameous flowers and leaves with very numerous parallel secondary veins. The generic concepts, founded on the vegetative characters (as *Micropholis*) or in the tetramerous or pentamerous flowers, seems to me to be a hopeless cause, especially in this family of endless modifications in the status of the species.

If *Micropholis* should be conserved, with flowers tetra- and pentamerous, then *Pouteria* must also be on the same basis and not reserved for tetramerous species as Prof. Aubréville would have it. Finally, *Micropholis* would only rest on the peculiarity of the lateral veins; a character which appears here and there throughout the whole family Sapotaceae, and is considered to be of sectional and not of generic value. For all these reasons, I think that this species should better be considered in the genus *Pouteria*, sensu Baehni.

Pouteria Wurdackii (Aubr.) Adansonia 5: 203, *t. 2.* 1965.

Tree 15 m. high (collected only once) with very stout branchlets (13 mm. diameter in botanical samples) rusty pubescent at the ends, with tomentose buds. Leaves coriaceous, elliptical, shortly acuminate (acumen 5–7 mm. long), cuneate at the base; blades up to 30 cm. long, 12–15 cm. wide, above almost completely glabrous, beneath rusty pubescent along the principal veins, puberulous—becoming glabrate—elsewhere; midrib slender above, very strong and prominent beneath; 25–30 pairs of lateral veins prominent and conspicuous beneath, arching toward the margin: tertiary veins prominulous beneath, forming a dense and irregular network; petioles stout, terete, pubescent when young but later glabrate, 2.5–3 (5) cm. long. Flowers sessile above the leaf scars, very numerous all along the terminal branchlets, with concave and ciliolate bracteoles, 2 mm. high at the base; calyx tetramerous, with sepals quite free, the two exterior concave-ovate, rusty-pilose on the back, glabrous inside, thick, 7–9 mm. long, 6–7 mm. wide; the interior up to 12–13 mm. long, with the margins thinner and glabrous, ciliolate at the borders; corolla glabrous and white, fleshy, tubular, up to 18 mm. high, with 4 lobes rounded and minutely ciliolate, 5 mm. high; stamens 4, filaments semi-terete, inserted on the middle of the tube or a little above, anthers basifixed, cordate, slightly apiculate, 2–2.5 mm. high; staminodes 4, subulate, near to 5 mm. long; pistil as long as the corolla, ovary densely hirsute, hairs straight, beneath the tomentum deeply sulcate and truncate, only 2 mm. high, 4-celled, ovules attached near the bottom of the loculi. Berry unknown.

Loreto: High rainforest along Río Marañon near Teniente Pinglo, just above Pongo de Manseriche, alt. 250–300 m., *Wurdick 2115* (Typus: F). Tierré Doble on the Río Nanay, *Williams 899* (F).

PRIEURELLA Pierre

REFERENCES: Baillon, Histoire de Plantes 11: 297. 1891–1892; Engler in Engl. et Prantl, Nat. Pflanzenfam. Nachtr. p. 278. 1897; Aubréville, Adansonia 1, 19. 36. 1961, id. 4, 369–371. 1964; Baehni, Boissiera 11: 77. 1965.

Small American genus of four species of small or medium-sized trees encountered, up to date, in the Amazonian region (sensu lato); coriaceous leaves, generally oblanceolate, glabrous or more frequently with a rusty pilosity. Inflorescences cauliflorous or on the aged and fairly wooded branches; flowers (4) 5-merous, with slender and rela-

tively long pedicels; calyx quincuncial, sepals almost completely free; corolla broadly campanulate, without appendages, tube very short; stamens attached to the throat, staminodes none; pistil with obsolete style, ovary (4) 5 locular, berry 4 (5) seeded, seed with short and narrow scar.

This small genus is based on a single character that is not very impressive. I think it is doubtful if the genus can really be separated from *Chrysophyllum* in the broad sense by either fruits or seeds. The cauliflorous inflorescences, in comparison to those borne on the branches in *Chrysophylllum*, might be used to differentiate *Prieurella*.

However, in the Bignoniaceae, Lecythidaceae, Meliaceae, Sterculiaceae and in the genus *Swartzia*, for instance, the cauliflorous species are firmly maintained in the same genus to which ramiflorous species pertain.

Prieurella Prieurii (A.DC.) Aubréville, Adansonia 4: 370. 1964. *Chrysophyllum Prieurei* A.DC. Prodr. 8: 161. 1844. *Ecclinusa Prieurii* (A.DC.) Aubréville, Adansonia 1: 20. 1961.

Tree medium-sized, with hard wood; branchlets robust, compressed, furrowed and with rusty-red, appressed pilosity at the ends. Leaves very coriaceous, obovate, rounded, emarginate or broadly acute at the extremities, sharply cuneate at the base; petioles robust, terete, 3–4.5 cm. long; blades 13–18 cm. long, 8–10 (11) cm. wide, glabrate and shining above, with a dense, shortly appressed rusty-red pubescence beneath; midrib very thin but prominent above, strong and prominent beneath; lateral veins almost completely straight, arching slightly only near the edges, in 10–12 pairs, fairly prominent beneath, quite flat above; secondary veins nearly orthogonal to the midrib, generally uninterrupted from one to the next; veinlets scarcely noticeable beneath, hidden by the hairs. Flowers in fascicles of 5–10 in the axils of the leaf scars on fairly mature (2–3-year-old) branchlets, 15 mm. diameter, and also—according to the collectors—on the old branches and trunk; pedicels slender, 10–15 mm. long, furrowed and compressed, slightly enlarged toward the top, pilosity dense, composed of minute rusty-red hairs; flower-bud globose, 3 mm. wide; calyx quincuncial, with sepals almost completely free, keeled, densely silky inside, pilose on the back, the outer two coriaceous, large ovate, 3 x 3 mm., with entire margins, the inner two elliptical, 3 x 2 mm., long ciliolate; the intermediate sepal somewhat irregular in shape, acute, the covered portion long, ciliolate; corolla pentamerous, imbricate, broadly campanulate; petals glabrous, obscurely

keeled, broadly elliptical, 3 x 2.5 mm., connivent at the callose base for 1 mm.; stamens short, 2 mm. high, with flat filaments attached to the corolla throat, anthers ovate, dorsifixed, extrorse, apiculate; staminodes none; pistil silky pilose, deeply furrowed, style obsolete, stigma obscurely 5-lobed; ovary 5-celled, ovules attached to the top of the loculi by the upper part of their adaxial side. Fruit not extant.

Guianas, Amazonian Brazil and Peru. Huánuco: Distr. Alomia Robles, Maroma Alta, Hacienda Delicias, alt. 800 m., *Gutierrez 114* (F).

The Peruvian sample exhibits bigger leaves and petals that are completely glabrous inside, while in the type of this species (*Leprieur* s/n, Hb. DC, G) a tuft of red-brown hairs is noticeable at the base of the inner face of the petals. However, I think that these differences are not sufficient to warrant a distinct specific or varietal status.

Prieurella Wurdackii Aubréville, Adansonia 5: 203, pl. 3. 1965.

Tall tree, up to 30 m. high (collected only once) with stout branchlets. Leaves coriaceous, obovate, shortly acuminate with a blunt acumen 5 mm. high, cuneate at the base, pedicels slender, semiterete, smooth, 20–25 mm. long; blades 14–18 (20) cm. long, 5–7 (8) cm. wide, glabrous and shining above, with silky and very scarce short hairs beneath; midrib slender above, strong prominent beneath, lateral nerves arched-ascending in 10–12 pairs; veins connecting the nerves regularly and in an almost parallel manner; tertiary veinlets numerous and orthogonal to the veins; the network fairly noticeable on both sides. Many-flowered (15–20) fascicles frequently pressed together on the fairly woody, quite defoliated branchlets of 2–3 years; pedicels very slender, slightly compressed, covered with a sparse, short, appressed pilosity, 6–10 mm. long; flowers globose when in the bud, 3 mm. wide; calyx quincuncial, with sepals completely free, the two outer concave, thick, almost orbicular, slightly keeled, 2 mm. wide, sparsely pilose on the back, densely silky inside, the two inner ovate, thinner, wide elliptical, 3 x 2 mm., ciliolate at the margins, silky on both sides; the intermediate sepal has its covering half like the outer sepals and the covered half the inner; corolla glabrous, imbricate, pentamerous, with petals almost free, nearly orbiculate, 3 mm. high; stamens generally aborted (I did not observe any anthers), filaments slender, 1 mm. long, inserted at the corolla base; staminodes none; pistil short and thick, 2 mm. high, style obsolete, stigma whitish with 5 obscure lobes, ovary 5-furrowed, densely silky, 5-celled, ovules attached toward the base of their adaxial side. Fruit unknown.

Known only from the type. Loreto: Prov. Alto Amazonas, rainforest on lower northwest slopes of Cerro Campanquiz, Río Marañon just above Pongo de Manseriche, elv. 250–350 m., tree 30 m. with copious milky latex. Flowers yellow-brown, *Wurdick 2293*,[1] type (F, G).

RICHARDELLA Pierre

REFERENCE: Aubréville, Adansonia 1: 174. 1961; Baehni, Boissiera 11: 95. 1965.

Medium-sized, rarely tall trees or shrubs, flowers in fascicles, calyx simple, generally 4–5 (6)-merous, petals thin, without appendages, staminodes always present; ovary 4–5-celled (rarely more or less), berry usually 1-seeded, the seed bearing a long and very wide scar, embryo upright.

Flowers with very short pedicels; corolla lobes 4.

Adult leaves silky beneath.....*R. glomerata* var. *glomerata.*

Adult leaves glabrous beneath.....*R. glomerata* var. *glabrescens.*

Flowers with pedicels 14–18 (25) mm. long; corolla lobes 5 (6). *R. macrophylla.*

Richardella glomerata (Miq.) Baehni var. **glomerata.** Boissiera 11: 97. 1965. *Lucuma glomerata* Miq. in Mart. Fl. Bras. 7: 81, *t. 36, fig. 2.* 1863. *Pouteria glomerata* (Miq.) Radlk., Sitzb. Math. Phys. Cl. Acad. Wiss. München 12: 333. 1882. *Abatia glomerata* (Miq.) Radlk., l.c. 14: 451. 1884. *Guapeba ? glomerata* (Miq.) Pierre, Not. Bot. Sapot. 43. 1891. *Labatia parinarioides* Radlk., l.c. 14: 451. 1884. *Guapeba ? parinarioides* (Radlk.) Pierre, l.c. *Pouteria Weddeliana* Pierre, l.c. 45.

Small tree up to 12 m., or shrub 3–4 m. high, with stout, red-brown branchlets, almost cylindrical in the lower portion of the samples, slightly furrowed and grey puberulous at the ends. Leaves subcoriaceous, obovate-elliptic or obovate oblong, shortly acuminate, generally obtuse at the base, glabrate above, silky beneath, 6–12 cm. long, 2.5–5 cm. wide, midrib large and flat on both sides, almost obsolete above, red or dark beneath, then showy from the whitish surface; petioles short, 4–8 mm., stout, silky and flat above. Flowers 5–10 in axillary fascicles, tetramerous, pedicels 2 mm. long, sepals largely almost free, elliptical, the two external thick and densely

[1] In Adansonia, l.c. it is stated to be Wurdack 2290. This is a misprint.

pilose outside, glabrous inside, 4 x 3 mm.; the internal glabrous, slightly narrower and ciliolate; corolla large-tubular, 4 mm. high, with four rounded lobes only 1 mm. high, minutely ciliolate; staminodes petaloid, inserted between the lobes, rounded or truncate, half as high as the lobes; stamens 4, reaching the top of the corolla, filaments inserted near the base of the tube, 2 mm. long, anthers apiculate, basifixed, 1 mm. high; pistil 3 mm. long, ovary long hirsute, apparently 2 mm. high, but deprived of the hairs, only 1 mm. high, style slender, stigma quite obsolete; ovary 4-celled, the ovules attached by the middle of their ventral face. Berry apple-like, 3 cm. in diameter; seeds 3–4, ovoid with a very wide scar.

Type: *Pohl 2/n*, "ad Río Maranhâo" Brazil.

Argentina, Brazil, British Guiana, Paraguay, Peru. Loreto: Ucayali Basin, Yarina Cocha, alt. 150 m., *Tessmann 3470* (G, S).

Richardella glomerata (Miq.) Baehni var. **glabrescens** Huber. *Pouteria glomerata* (Miq.) Radlk. var. *glabrescens* Huber, Bull. Soc. Bot. Genève, ser. 2, 6: 197, *fig. 11*. 1914.

Tree, with elliptical membranous leaves (in Peruvian sample) 8–10 cm. long, 2.5–3.5 cm. broad with nine pairs of thin secondary veins, glabrous when adult; flowers identical to those in the var. *glomerata*. Fruit unknown.

Type: *Ducke 7921*, Para, Río Cumina, near to Lake Castanho (Brazil).

Brazil, Peru. Loreto: Region of the Río Ucayali, from 10° S to its mouth, *Tessmann 3486* (G, S).

Richardella macrophylla (Lam.) Aubréville, Adansonia 1: 175. 1961. *Chrysophyllum macrophyllum* Lam. Tabl. Encycl. 2: 44. 1793. *Pouteria macrophylla* (Lam.) Eyma, Rec. Trav. Bot. Néerl. 33: 164. 1938; Baehni, Candollea 9: 404. 1942. *Lucuma rivicoa* Gaertn. f., Carp. suppl. 3: 30. 1807; Miquel in Martius, Fl. Bras. 7: 71, Tav. 29. 1863. *Vitellaria rivicoa* Radlk. Sitzb. Math.-Phys. Cl. Acad. Wiss. Munchen 326. 1882. *Richardella rivicoa* (Gaertn. f.) Pierre, Not. Bot. Sapot. 19. 1890. *Vitellaria glaucophylla* Engl. Bot. Jahrb. 12: 513. 1890. *Lucuma rivicoa* var. *glaucophylla* (Engl.) Dubard, Ann. Musée Col. Marseille, 2 ser. 10: 15. 1912. *Lucuma acreana* Krause, Notizbl. Bot. Gart. Berlin 6: 169. 1914.

Shrub or tree up to 20–40 m., sometimes planted in tropical America for its edible fruits; branchlets terete and almost glabrate in the lower portion of the samples, angulate-compressed and frequently

densely appressed rusty pilose at the ends. Leaves papery, elliptical or obovate, frequently obtuse, sometimes acute at the extremity; base acute, merging in the long (15–25 mm.) slender, terete, rusty-pilose, sometimes slightly canaliculate petioles; blades glabrate above, glaucous or whitish beneath, silky puberulous becoming frequently glabrate, 14–18 (rarely more) cm. long, (4) 6–8 cm. wide; midrib semiterete, slender, prominent beneath, 12–15 pairs of lateral nerves, parallel, more or less patent, straight; tertiary veins almost obsolete. Flowers in axillary fascicles of 10 or more, sometimes very close all along the defoliate branchlets, slender pedicels 10–15 mm. long, minute ochre-yellow pilosity; sepals 5 (6) imbricate, ochre-yellow pilosity, the exterior generally smaller and thicker, ovate, up to 7–8 mm. long, 5–6 mm. wide, ciliolate; corolla tubular, fleshy, greenish-white, rather long, 8–11 mm., sparsely silky outside, becoming glabrate, 5 (6) rounded lobes quincuncial, ciliolate, 4–5 mm. high; staminodes subulate, almost 3 mm. long; stamens fertile 5 (6) with filaments subulate almost 3 mm. long; inserted at the same height as the staminodes, 2 mm. long; anthers basifixed, nearly ovate, 1.5–2 mm. high; pistil as long as the caducous corolla, style projecting in the older flower; ovary short rusty-pilose, globose, 2 mm. high, cells 5–6, rarely more; loculi very small and opened toward the style base; ovules attached at the top. Berry globose, 1-seeded; seed ovoid, 25–30 mm. long; scar as long as the seed, very broad.

Widely distributed in Guiana, Brazil, Ecuador, Peru, and Bolivia.

Type: *Aublet s/n* (P).

Madre de Dios: Seringal Auristella, Río Acre: *Ule 9691* (G).

SARCAULUS Radlk.

Reference: Engler, Bot. Jahrb. 12: 508. 1890; in Engler et Prantl, Nat. Pflanzenf. 4, 1: 142. 1891; Lam. Bull. Jard. Bot. Buitenzorg, ser. 3, 7: 192. 1925; Eyma, Rec. Trav. Bot. Néerl. 33: 192. 1936; Cronquist, Bull. Torr. Bot. Club 73: 465. 1946; Baehni, Boissiera 11: 48. 1965.

Trees, leaves without stipules, secondary veins distant; flowers in fascicles; calyx simple, 5-merous, imbricate or quincuncial; corolla fleshy, very thick, globose, lobes subvalvate in appearance but really slightly imbricate; staminodes 5, thick; fruit incompletely known, 1-seeded, scar shorter than the seed.

Two species in South America.

Blades membranous, glabrate or with scattered hairs below, network almost obsolete, acumen 10 mm., petioles scarcely 10 mm. long; sepals 2 mm. high. . . . . *Sarcaulus brasiliensis.*

Blades coriaceous, puberulent below, network conspicuous, acumen 15–20 mm., petioles 15 mm. long; sepals 4 mm. high. *Sarcaulus Wurdackii.*

Sarcaulus brasiliensis (A.DC.) Eyma, Rec. Trav. Bot. Néerl. 33: 192. 1936. *Chrysophyllum macrophyllum* Mart. Herb. Fl. Bras. 175. 1837, non al. *Chrysophyllum brasiliense* A.DC., Prodr. 8: 156. 1844. *Sarcaulus macrophyllus* (Mart.) Radlk. Sitzber. Bayer. Akad. Wiss. 12: 293, 310. 1882.

Tree, branchlets robust terete and glabrous below, subangular and fuscous above with appressed hairs. Leaves narrowly ovate to narrowly obovate, acuminate at the tip, cuneate at the base, glabrous and opaque above, with scattered hairs below when young, becoming glabrate with age, chartaceous or coriaceous; midrib prominent beneath, veins in 8–10 pairs arcuate, spreading, slender, obsolete above, prominulous below, tertiary veins very slender; blades 10–18 (22) cm. long, 5–7 cm. wide; petioles 6–10 mm. long (in the Peruvian specimens), stout, subcanaliculate. Flowers in clusters of 3–6 (8)in the axils of the leaves; pedicels filiform, broader below the flowers, rusty-pubescent, 12–24 mm. long; sepals 5, patent, ovate, keeled, obtuse, finely pubescent on the back, ciliolate at the margins, glabrous inside except for a few hairs at the base, 2 mm. long and wide; corolla globose, fleshy, very thick, appressed silky outside, lobes 5, almost as long as the tube, scarcely imbricate, 3–4 mm. long, stamen with filaments very short, pilose at the base, attached to the throat, anthers emarginate, staminodes widely triangular to subulate, on the throat, silky outside, glabrous inside; ovary 5-celled, bottle-shaped, 5-angled, style very short, stigmas 5, punctiform and inconspicuous; ovules attached to the base of the loculi. Fruit not seen.

Type: In silvis ad Para et fluvium Japura, *Martius* (M).

French Guiana, Surinam, Brazil, Peru. Loreto: Ucayali basin, between 10° S and its mouth, *Tessmann 3241* (G, S), *Tessman 3457* (G).—Amazonas: Rainforest along Río Santiago, 10–15 km. above the mouth, elev. 250 m., bushy tree 15 m. with milky latex, corolla pink, *Wurdack 2494* (F, G, LE).

Sarcaulus Wurdackii Aubr. Adansonia 5: 240. 1965.

Tree, 15 m. high (in the type) branchlets robust, cylindrical, at

the apex rufous-pubescent, with appressed, dense hairs. Leaves elliptical, coriaceous, distinctly acuminate at the tip (acumen up to 15 mm. long), the base subacute or obtuse, glabrous above except for the principal veins densely covered with reddish short and appressed hairs, rufous-puberulous below, more densely on the veins, petioles robust, rufous-pubescent, up to 15 mm. long, slightly canaliculate; midrib strongly prominent below, secondary veins in 12–15 pairs, fairly prominent below, arcuate-ascending, forming with the tertiary veins a prominulous reticulation on the lower side, quite obsolete on the upper one. Flowers and pedicels cupreous-pilose, fasciculate (5–12) in the axils of the leaves, more frequently above the leaf-scars; pedicels (10)–15 (20) mm. long, slightly enlarged above; sepals 5, quincuncial, the two inner smaller and thinner, the remainder thick-coriaceous, triangular-concave, 4 x 3 mm., quite glabrous inside; corolla very thick, fleshy, 4 mm. high, cupreous-sericeous outside, glabrous inside, however, with the border glabrous and white, free lobes slightly imbricate, ovate, 2 mm. high; stamens 5, reduced to very small and subulate filaments encircled by the thick staminodes, sparsely sericeous-pilose; pistil stout, 2–2.5 mm. high, glabrous, style only 0.5 mm. long, stigma inconspicuous, obscurely 4–5 lobed; ovary 4–5 celled, furrowed, densely sericeous, ovules attached by a very short and thin funicle from the middle of their adaxial side. Fruit unknown.

Type: *Wurdack 2425*.

Endemic, up to the time of writing, in Amazonian Peru. Loreto: Río Marañon, rain forest at upper end of Pongo de Manseriche, 250 m., *Wurdack 2425* (F, G, LE). High rain forest along Río Marañon near Teniente Pinglo, just above Pongo de Manseriche, 250–300 m., *Wurdack 2121* (P).